

# SEQUENCE LISTING

<110> GLENN, MATTHEW  
HAVUKKALA, ILKKA J  
LUBBERS, MARK WILLIAM  
DEKKER, JAMES

<120> POLYNUCLEOTIDES AND POLYPEPTIDES,  
MATERIALS INCORPORATING THEM, AND METHODS FOR USING  
THEM.

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<170> FASTSEQ FOR WINDOWS VERSION 4.0

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ACTGGCCAAC	CACTGCCACC	CGCGGGCTAT	CGAGTGCCGC	AGTCGGTTCA	TCCGCCAGTA	1440
CAATCGCCCG	ATCCGGATAA	AGCGCCCGCG	CAATCGCTAC	ACGCTGGGTT	TGACCGCCTG	1500
ATAACGATGC	CGGATACTGA	TTGACCAAGT	TGGCAATACC	CAGATCATCC	AATAACTCAG	1560
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CACCGACTGT	TAAATACGGC	ACCAAGTTAT	AAGACTGCAG	AACAAAGCCG	ATTTTGTCTA	1680
ACCGCAACGC	ATCCCGCGCT	TTACCAGAAA	GTTGTTCCAG	ATTTTCCCCG	GCTGTGGTCA	1740
CAATCCCGTC	AGTCGGGGTT	TGAATCCCCC	CGGCGATGGT	TAGGAATGTG	CTTTTCCCCG	1800
ATCCAGATGG	CCCAGTACC	AACGAGAGAC	TGCCGGCATC	GGCACTGAAA	TTGACGTTCT	1860
TGAGTACTTC	AACGTCACTG	GTTGGCGTTT	TAAAGTTTTT	AATGATGTTT	TTTAATTCTGA	1920
TTGCTGGCAT	ATCATCAACC	TCCAATAGCG	GTAACAGGAT	CAACTTTTAA	GATGGTGCGT	1980
ACAGGGATAA	TCGCGCCGAG	AAAACCGGTG	AGCAGGATGC	CTAAGATAAC	GGCAATACTG	2040
AGTCCCGCCG	AGAAAATCAT	CGGCACACCC	AGCGGCATGA	ACTTGGCGGT	AATCGCCGTC	2100
AATGCGCCGC	CTAAGACGAG	TCCCAGACTG	ACTAAAATCA	GTGCCTGATC	AATCGTGGTC	2160
GCAACCAAGG	TCCGTGCTGG	TACACCTTGG	GCCCGCAATA	CCGCATAGTT	TGGCAGTTTT	2220
TGCATGGTCA	AAATGTAGAG	GAAAACGGCG	ATAACGATCA	GTGAAATGAC	AAACAGGAAC	2280
CCAATCATAA	AGGTAAAGGT	GCTATTTTGC	GCCGAATACC	CTGGGAGTTT	CTGAATAAAC	2340
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ATGATCCAC	TGGCGGTAAA	ACTGGTCGGC	AGATTGTGCA	AGGTGCGCCA	AGTGGTCATC	2460
GTGCCATAGA	CCACCGGCGC	CACACTCATT	TTGGCGTTCT	CGGTAAACCC	GACAATGGTG	2520
TAGCGATCGC	CTTTAGTACT	CAAGCGAATC	TTATCGCCAA	GCGTGTAACC	TTCATTCTTG	2580
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TGCTGGCTGC	TCGTTGCCAC	CGCGCCGATT	GTTCCGACAT	AGGCCTGACT	TTTACCTAGC	2760
TTGAGATCAG	GATGAGGATC	GGTACTTGTT	GGATTATCTA	AAACTCAATG	TTGATCAATC	2820
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TAAGCAGTTG	CCGGTAGCCA	AATATCACGC	CGGCATGACT	GAAAAGCAAC	GTGCTGCTAA	2940
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GTTATTTAGA	CCGCAAGACT	TGCAGGTGCA	ACGGTTTTTT	ATTGAACAGT	CTGAAGGTGA	3180
CGAGGCGCAT	CAACGGCGGC	AGTATGAAAA	ACTTAAAGTT	ATGGAACGCT	ATGCCAACAC	3240
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TGGACGTTGT	TCGAACTGCC	TAGATGATCG	TGAATCCGTT	GATGTGACCA	TTGACGCGCA	3360
GAAGGTTCTG	TCGTGCGTTG	TCCGATTGCA	TGAGCGATTT	GGTAAAGGCA	TTGTTGCCCA	3420
GGTCTTGCT	GGCGCCCA	ATCAGCGCGT	TTTGTCGTTT	CACCTTGATC	AATTGTCAAC	3480
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CGCTGGTGGC	TTTCTGGAAA	CGTGTGGTGG	TCAGTATCCA	ACGCTTGGTT	TAACCGCAAA	3600
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GGCGGAGCAG	CAGCATTTAC	CGCCGTATAT	GATTTTTTCC	GATAAGACGT	TAAAAGCGAT	3780
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TTCTAACCGG	GCTGGCTCAC	GCTCACCATA	ACGCGTTCGC	TGGCGCAGGA	ATCTGCGTGT	4080
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CCAAGGCCGC	TTACGTTCTA	GCTTATGCCC	ATAACGCGTT	CGCCAGCCCA	GAAACCTGCG	4200
TGTAAGGACC	TCAGCCGCAA	TGGCCAAAGC	CCGGCCATCA	CGTCTGAGGC	CACTTACACT	4260
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GGTTTAAATGC	CGTCAATGTT	CATCGCGGCT	GAGCCCATCA	TGAAGTCAAC	GTGGGTCGGA	4500
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GAGAACGGAT	AGGCTTGACC	GAGTGCCATA	TGATCGGAAG	CATTTTCGTC	AAACAGCGTA	4620
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CCTAATGAAC	GAGCACCCGG	CGTTTTTAGC	AGGTTTTGTA	AGACGTCATC	GCCTTGTTTTG	4740
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GCGCCGCGCG	CTTCCCAAAT	GTGGTCTTTT	GGTAAACCGA	CTACCAAATC	CGTTCCCGGA	4980
GCCATGTAAT	GCAGCTGATC	AAATTGTTTCG	TTGTTTAACC	AGGCCGCTTT	TTCCCGCAGC	5040
TTTTGATCGT	GGGCTTTCCA	GGCAGCTTCC	GGATCGGGTT	GATCGATTTCG	GGTAGTTTTG	5100
AAAATTGCCCT	CCCAGAGTAG	CTCAGTTGCT	TCTTCAGGGG	TGGCGGCATC	AGGGAAAACCT	5160
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TGGTGATCAA	CCCAATAATC	GAATTGACCT	TTGACAAACG	CCGGGATGTT	GAAAAGGCGC	5400
TCGTTTGCCA	TGTGCGCCAT	ATCTAAACGC	TTGAGTACAT	CATCGAACCA	CTGAACCTGA	5460
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TCCACTGAAA	TTTGCACGTA	AACGGTATCG	CCGGGTTTAA	CGGCCACCCC	AATATCGACT	5580
GCCAATTCGG	CATATTTTTT	AAGGCTTTTCG	TTAAAGTTAG	ATAATGTCAT	AAAAATGCTC	5640
CTCCTCAAAG	TGATTGGCAA	TAGTTTACCA	TAGGGCGGCG	AATTCGATAT	CAAGCTTATA	5700
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<213> LACTOBACILLUS RHAMNOSUS

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AGCCGGTTTT	CTCAATTGAT	CTGGACACCG	GCAGCGTTGC	CAACCAGAAA	AAAAGCGGTC	180
GGTGCTGGCT	CTTTGCGACA	TTGAATACAG	TCCGCCACGG	GATTGCGGAT	GAATTTGGCA	240
TCAAGGATAT	CGAATTCTCA	CAAAACTACA	ATGCCTTCTT	TGATCGCTTG	GAAAAAGCCA	300
ATTTATTTTA	TGAAAATATT	CTGGCAACCG	CGGACAAACC	CCTGGATGAT	CGAGAGGTTG	360
CCACTTACTT	AAGCGGTCCA	GATGAAGATG	GTGGCCACTA	CGATCAAGCG	GCCGCCTTAA	420
TTGAAAAGTA	CGGTTTGGTG	CCTAAGTCGG	TCATGCCGGA	AACTTATAAC	AGCGACAAAA	480
CCGCTGAACT	CAACAGTGTG	TTGAACGAGA	AATTGCGTAA	GGATGCCAAG	GTGTTGCGGA	540
CCCTCAAGCA	AGATAACGCC	AGCGAAGAAG	CCATCGCCAA	GCAAAAGCGC	GAATTTCTCA	600
GTGTTGTTTA	TCGCATTTTG	GCTTACACCT	TTGGCAATCC	GCCGACAACG	TTTGATTTTG	660
AATACCGTGA	TGACAAGAAG	CAATACCATC	GCGATACTAA	CTTGACCCCG	CAGTCATTCT	720
TCAAAAAGTA	CGTCAAATGG	CATTTGACG	ATTACGTGGT	GATTGCCGGC	GATCCCGAAC	780
CAACCAAAAA	GATACAGCAA	TTGTATACGA	TCAGTGCGGC	CAATACGGTT	GTGGAAGGCC	840
ATCCGCTGAC	AATTTTAAAT	CTCCCACCGG	AACGCTTGAA	GCAGTTGGCA	TTAACGCAAT	900
TGCAAGCAGG	TGAAGCTGTC	TGGTTTGGCA	ATGATGTACT	AGCCGACATG	GATCGCAAAT	960
CCGCGACGCT	TAAAGGCGGC	TTGTTCAATT	ACAGTGATTT	GTTTGGTATC	GATTTCCACG	1020

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CCGGCGCCGA	TGTCGTTGAT	GGCACGGTCA	CCAAATGGAA	AGTCGAAAAC	TCATGGGGCA	1140
AAGAAAATGG	CCATGATGGT	TACTTTGTGG	CCGATGCCAG	CTGGTTTGAC	CAGTACGTTT	1200
ATGAAGTCGT	GGTTCGCAAG	GATCTTTTAA	CTGACGCGGA	ACAAGCGCTT	CTTCAAACCG	1260
AGCCGATCAA	CTTGCCTGTA	TGGGATTTTC	TAAATTAAGA	TTAACTGATA	TGCTAAACTA	1320
AGCGAGTCAC	AAAACGGGTG	CCGGCTTATG	ACGAAATCTT	CGCCGCCTTT	TCGAACGACC	1380
ATGATTTTCA	TTACCAGCCG	CATGGTGAAT	CAGCTTATGC	ATATAAAAAG	GGAGTGTTTA	1440
TTTAATGTCT	GCAGAAATTA	CTTCAGGCGA	TTTGGATCAG	TTCAAACAGG	ATCTTCAAGC	1500
CACACCTGCC	GCCAACGCCT	TACAAAAAGC	GGTCATGAAC	AATGGTATTA	ATGCAACTGC	1560
CGAGAATACC	GATAGCAAAG	TTGCCATGAC	ACCAACGTTT	TCAATTGAAC	TTGATACCGG	1620
TGCTGTGTCA	AACCAAAAAC	AAAGCGGCCG	GTGCTGGATG	TTCGCCGCCT	TGAATACTAT	1680
GCCTCATGGC	ATTCAGGCAC	AGTTTAAGAT	CAAGGATTTT	GAAGTGTCCC	AAAACCTACAC	1740
CTTCTTCTGG	GACAAAGTTG	AAAAGTCCAA	CTATTTTAT	GAAAATGTCT	TAAAAACCGC	1800
TGATCAACCA	CTCTACAGCC	GTAAGTTGTC	CTTTCTTTTG	GCTACCCCGC	AACAAGATGG	1860
CGGCCAATGG	GATATGTTGT	CAGCCTTAAT	CGAAAAGTAT	GGCATTGTGC	CGAAGTCAGT	1920
AATGCCTGAA	ACCTACAGTT	CTAGCAAGAG	TAACGAATTA	AATGGTTTGC	TCAACTTGAA	1980
ACTGCGTAAA	GATGCGGTCA	CCCTACGCAA	GTTAGTTGCT	GATAAAGCTA	GCGATGCCGA	2040
CATTGAAGCA	GCCAAGCAAA	AAATGCTGGC	TGAAGACTAT	CGCATCTGGG	CATACACGTT	2100
AGGCAACCCG	CCAACCAAAT	TTGACTTTGA	ATACCGCGAT	GATGATAAGA	ATTATCACAT	2160
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CGATGTTGGT	CAAAGCTCCG	ATCGTCAACT	TGGCATTTTG	GACACCAACA	TTTACAAGAA	2460
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AAGCTTGATG	ACTCACGCAA	TGGTCTTGAC	CGGCCTTGAT	CTTGATAGACG	GCAAGCCAAC	2580
CAAGTGGAAA	GTTGAAAACT	CTTGGGGTGA	AAAAGTCCGC	GAAAAAGGCT	ACTTTGTCTGC	2640
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AGCTGAACTA	CAGGATGTCA	TCAAGAACGA	ATACGACAAG	CCAACCGTTC	TTGCACCTTG	2760
GGATCCAATG	GGTGCTTTGG	CATCAAGATA	AGCTTGATCT	GAAAAACTA	AGATAACTGG	2820
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CAAACCAATG	CGGCTGACTG	AGTGACTTAA	CGCTCATAAC	GCGTTTTCCA	GCGCAGAAGT	2940
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<213> LACTOBACILLUS RHAMNOSUS

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GAATAACCAA	CTTTAACCAA	GCCAGTCCGC	ATCGTTAGCA	GATTCTGTTG	CGTACTGGCT	180
TGGCTTTTTT	AATAACATGA	TTGCGCAAAA	AATGAGCAGA	CGGGATTGCA	CTCATGTGGA	240
TATTTATGCA	TAATATATTT	ACATTTTCCA	AGATAACGGG	TAAACTCTAA	GACAATTAAG	300
AAAGCAGGTG	GCGTAATGTT	ACGCAACAGT	ATTGCCGGGC	TGCCGGATTA	TGTCTCAGAC	360
AGCACCCCGG	AAAGAATCGC	CAAAGCGGCC	GGTTTGCTA	AAATGACGCG	CTTGTCATTC	420
AATGAAAATC	CGGTCGGTAC	CTCGCCAAAG	GTCCAGGCAG	CGCTTGAAAA	CTGGGCCTTT	480
TCCCAGGCAC	GCAATTATCC	TGATCCGGAT	GCGCTGCCAT	TGCGGACCGC	GGTTGCCAAA	540
CGGTTGGACA	TACCAGCGGA	GCAATTACTT	TTTTCCAGTG	GATTAGACGA	AATGATTGCT	600
TTGATTTGTC	GCACTTTTTT	AGAAGTAGGC	GATGAGAGCC	TACAACCTTG	GCCGACTTAC	660
CCGGAGTACC	AGTTACAAGC	CGCCATTGCC	GGAGCCACAA	CGATTAATGC	CCCCGTGATT	720
GCCGCGACCG	GTTTGATTGA	TCTTGACGCG	TTATTAGCCC	ACATCACGAC	AAAAACCAAA	780
GTGATCTGGG	TATGCAACCC	CAACAATCCG	ACAGGTACTT	ATTTGCCCCC	GGATCAAATC	840
GCGCAGGTTA	TGAAGCAGGT	GCCGCCCAAC	ATTCTCGTTG	TCGTGGACGA	AGCGTATATC	900
GATTTTGTCA	ATCAGCCCGA	GCCATCCACG	CTATCGTTGA	CTCATCAGTT	TCCCAATCTG	960
CTCGTCATGC	GAACCTTCTC	GAAATTATAC	GGGTTAGCAA	ATTTTCGAGT	TGGCTTCAGT	1020

ATTGTTCCCTA	AAGCACTCAT	CCCCAAAATG	CAAAATGTCC	GTCTCCCGTA	TAACATCAGC	1080
GGCATGAGTC	AGGCAGCGGC	TTTAGCGGCC	TGGGAAGATC	AGACATTCAC	ACGCAAGGTA	1140
AAACAACAGA	TTTTTGCCGC	CCGGAAGCAG	TGGCATCAAT	TTTTTGATCA	GCACCAAATC	1200
CGCCATTATG	CCACACAAAC	CAATTTTCATG	CTCTATCAGG	TCAATGATCC	GCAAGCACTG	1260
GGCACTTTCC	TGAAACAGCA	CGGTTATCTG	GTGCGTGACA	GCATGGTTCC	TGGCTGGATT	1320
CGTCAAAGCT	TTGGAACGCC	AAAGCAAGAT	GCAGAAGTTC	AACAACGTGT	ACTGACTTTT	1380
TTAGGAATCA	AACAGACTTC	AAATATTAGC	TAATTTTTGT	ATATTTGTTT	ATAAAAAATG	1440
CAAAAATAAA	AAACAAATAA	TCGATCATTG	AAAAATTTTT	TTGCCGCACA	TTAAAAAAAT	1500
ATGGTTGACA	ATTTTTAAAA	TGTCGTTATG	ATGAGAGTCA	CATTAAATCA	ATAGCCATGA	1560
AGTTGTGATT	AGACCAAGTA	GGTTGGCACC	AATCCACAGA	GAGCGCCGAT	TGCTGAGAAC	1620
GCGTGATTGA	CCGACTGAAC	ACACATCTAA	GAACCTTGATA	GCCGAACCGA	GTAAGCTATC	1680
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GTGGATGCCG	ATGGTTATGC	GCGCTACCGT	CATGGCGAAA	CGCTCACGAC	CTCGCTGTCA	180
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AATGGAACGG	TTAAGAATTT	CTATCCAAAA	GGGCTGCGAG	TTTAGTTGGC	TTGCAATTTA	300
GTATCAGCAT	CTTAAAAAGT	AATCAAAAAG	GATGTTAGTG	ACAGGCTAGG	TATTGTCTGT	360
TTACTAGCAT	CCTTTTGTTA	TTGACCTAAA	ATCAAATTGC	TGGCAAGTGA	CGGACATGGC	420
GATAATATTC	TAATTCAGGA	CTGAGCACAG	CCGGTGCCGT	TTGCAGTGCT	TGCCAGTTGG	480
TCACGCCTAG	CAATGCATAC	AGTTGCCGTA	ATTGTTGCAG	GAATTCCTGA	AAGTAGGCTA	540
ATGTAGCCGC	ATAGTCAGTT	TGAATCAAGT	GGTGCAGCAC	CAGTCCACTG	ATGCCCACCG	600
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CCAGGATTGT	TAACGGTAGT	CCGCGGGCTT	CAAGCAGTGA	CTCAACGGTT	GTTTGCCCCC	720
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CTTCTTGTGC	CGCATTGACG	TGAATTTCAA	GTGCATCCGC	GTCTAACATA	CTAATTGCCT	1020
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GCTTGCCGGT	TTGCGGGGAA	CCTCCTGTCA	TCGCATTAAT	GTAAATCGGC	CAACGCCAGC	1260
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GTAATCACTT	GCGCGTCCGG	GCCGAGGCGG	GTGCTCAAAA	TCCGGTCCGC	AAAAACAGGC	1500
TGCAAGGCGG	TCATGAGAAC	ATCCACGTAC	GGTGCGGTTG	TGAGGATCTT	GACGTTGGGT	1560
CCGGCATCCA	TCGTGGCAAA	CGCCGGAATG	CCGAGTGCCC	GCTGTTCTTG	CACCAATTGC	1620
CAGGCGCGTA	AAGTTTCCGG	CAAAAAGTAG	GTGAACGGCG	GCTCCTCAGC	CATAATGGCG	1680
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TAAGGGCTGG	TCGCAACCGT	GTTGGCCATG	CCTGTGCGGG	AGCTGACTGC	CTTTTTCTGA	1860
TCAGAAACCG	TGACGACCAA	CATCCGCAGC	GGCAGCGTTG	GCTGAATGGT	TAGGGGTTTCG	1920
GCAAACGAGG	ATTGATCATC	GCTGCCACGG	TGCCAAATCA	CCGCTCCGCC	AAAGATTGAA	1980
CGAGTGGCTG	ATCCTGAACC	GCGACGTGCC	AACCGTGACA	AGGCGGTAGG	GGTTAAATTT	2040
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AAACCGGCAG	CAGTCGGTAC	ATGATTCAAT	GAGGTGACCC	GAGCGCGTGT	ATCAATTTGG	2160
GCCAGGTGCC	GAACATGATC	CAAAAAGCGG	CTGACAGCAG	TAGGCGACTG	CATTTGGTGA	2220

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TTGCCCCAAT	ATTTGATCAA	TGCAATGTTA	GTGTGCGCGC	GTGCATAAGT	TGTCATAGCA	2400
GCCTCATTTT	GTTTCAAAGT	GGTATTCCCA	GACTTTAACG	GCATTGGCTA	CCTTTAGTGC	2460
CTGGATAATT	GCCGGTGCCT	GGTCCGCGGC	GGCAAGGGCA	ATCATGCAGC	CGCCCATGCC	2520
GGAACCGGTC	AGTTTCGCCC	CATATGCGCC	GTTATCAAGG	GCAACATTAA	TCAGTCGATC	2580
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<211> 1083

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 6

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CAAAATGACG	ATTTGTTGAA	ACAGGTTTCAG	GCTGCCAACG	AAAAAAGCGC	CAAACCTGAAC	180
AACGAGGTTT	CCAATAAGGT	TCTGGCGATT	CAGGATGCCG	AAGCCAAGAT	CAAGGACAGT	240
CAGGCCAAGA	TCGCTGATTT	CGCAACACAA	CTGACAAAAG	CCAATCAGGA	AGTCAGCAAG	300
CGTAAGAGCA	ATTTGAAGGA	TCAGCTGATC	TCTTTGCAAA	AGCGTGCCGG	CGACTCGGTT	360
ACTGGCAATG	TCTATTTTGA	CTTTATTTTG	AATTCCGACA	GTCTGACGGA	TCTTGTCGGC	420
CGGTCATTGA	CAGTTAGCAA	GTTGAGTCAA	GCCAGCGCCG	AAGCTTTGCA	AGCCGTTAAA	480
GACTCTGAAG	CCAAGGTTAA	AAACCTGAAA	GCTGCTCAGA	AAGCTAACCA	AAAGAATCTG	540
GTTGCTACCA	AGAGCCAGCT	TGAAAGTGAT	AAAGCCAAGA	TTGATGGCTT	AAAGGCGGAT	600
GCTGATAAGG	CAGCTGCCGA	TGCTCAACAA	ACGATTGATG	CTAACAAAGA	AAAGCTGGCA	660
GCCATGGCCG	CTGATGAAGC	TGCCAAAGCT	GAGGCGGCTC	AAAAAGCAGT	TACAGCTGTT	720
GCTAGTTCCA	CCGCTAGTGC	ATCAAGCACT	TCTGCTTCCT	CTAGCACAAC	CGCTTCTTCA	780
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ACAGTTTCCG	TGTCCGGTGG	CAGCATCGCC	GGTAACGCCG	CTAAATACCT	CGGCGTACCG	900
TATGTTTATG	GTGGCACATC	ACCTGCTGGG	TTTGACTGCT	CAGGCTTAAT	CTATTACGCA	960
GCTAAAGAAG	CCGGAATTAG	CCTGCCACGT	ACCTCTCAGG	CGCAAAGCAC	ACTTGGCTCA	1020
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CATGACAGCA	AAGCCAAGAA	GTTTAAAGAC	TTTCATGTTA	TTGATGAAAA	GTGCGTCATT	360
GACTTTGGTG	ATGTGTCGGT	ATCGTTCCTT	AAAACAACGC	ATAGCATTCC	AGGCTCGTTA	420
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CCTAGCGCTA	CCCCGATGTA	TCAAACGGAT	TGGGCGCGAT	TGGCACAAAT	CGGTAATAAG	540
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TTGCCCAACG	GTACAAGGCG	AAATCCGGTC	AATTTAATGT	TATTCACCTC	TGGCCCTAAG	600
CTGATCGCCG	TGTAACCTGGT	CAGATTGGAT	AAAATCTGCG	CACCTTTGCGC	CACAATTTCA	660
TCCATCTTAT	TGTAGCGTTG	ACCGAATGCT	TGCTTGATCG	TGGCTAGTTC	ACGGTGGGAA	720
ACACGCACTG	GCTCGACCAG	ATGATCAAGA	TAGTAGCGAT	AGCCTTGAGT	CGAGGGTACT	780
CGACCGGAAC	TGCTATGAGT	CTTGGTGATC	AAACCGGCGT	CTTCCAGCGA	TGCCATATCA	840
TTGCGGATCG	TGGCGGAAC	GACATGAACC	GGCAGTTCCT	GCATTAACTG	CTTGGAACCG	900
ACCGGCTGCC	CACCTTTCAGT	AAACAGGCGG	ATGATTTCTT	TTAAGACGAG	CAATTGCCGT	960
TTCTGCAACA	TTTTCTCACC	TCACCTTTAG	CACCTGTTTT	ACACGAGTGC	TAATACACTG	1020
AATAATATAC	CAAGCGCCGT	TAGCAAAAGT	AAGGTAGGAT	TGCTAAAATG	TTGCATCAAA	1080
CAGCCAACTA	CGTTTAGATT	TTTGGTCATA	TCCGAAGCAT	GATTCATCAT	TAGACCAGTG	1140
GCTCATCAAG	TAGGAATTGT	TGGAAAACCT	CATTTCCCAA	AAACTTACCG	CGATTCGTCA	1200
GTCGAATATA	ACCATTTTGG	CGCTCGATTA	ACCCTTGGCT	TTCCAGCTCC	GGAACCGTCT	1260
CGCCATAAAC	TGCATCGACC	GTCATATGAT	AGCGGCTATA	AAAACGATCT	TCATTGACGC	1320
CTGCCATGGT	GCGTAAGCCA	AGGAACATTT	CTTCCTCAAT	TTGCTCAGAA	ACCGGTACTA	1380
AATGATGGGC	CAGAACCGGT	AAATGGTCGG	CATGCAACGG	TGCCAGATAC	TGTTTGATCG	1440
GCCCATAATT	ATGATACCGG	TCACGACCAA	GATAGCCAAA	TGCGCCTGCC	CCGAAGCCAA	1500
AATATTTATC	ATTTTGGCAA	TAAAGTAGAT	TGTGGCGACA	TTGGTACCCT	GTTTTGGCAA	1560
AATTACTAAT	TTCATATTGA	TGCCGTCCGT	GAGCTTCCAT	TAAATCAATG	GCATCTTGGT	1620
ACATATCAGC	TTCAACGTCT	TGCGTCGGCA	ACCGCAGCTT	CCTTTGACGC	ATCAGATTAT	1680
AAAAAATCGT	CTTGCGCTCC	AGGATCAATG	AATAGGTCGA	GTAATGTGGC	AAGTCCAATG	1740

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CATCCTTCGC	TCGGTGAATC	CGACCAATGC	GCTTCAAGAC	ATCATCATTA	AACGACTGCA	1920
CGCCAATCGA	CAGCCGGTTA	ACCCCAAAGT	CGTATAAGAC	CTGTAACCTG	TCGGTGGTCA	1980
GTAAGTCATT	GGGATTGGCT	TCAAAGGTAA	ATTACCGTG	ATCAAAATGA	AGAATATCGC	2040
GAATACCTTG	GCACAAAACG	GCAAGCTGTT	GCGGTGTCTG	CGTTGTTGGG	GTGCCACCGC	2100
CAACATAAAC	CGTTTCAATT	TTTTCTTCTG	GATGCTCTGC	CATCACCATG	CGCATTTCTT	2160
TGAGCAACAT	GGCGACATAA	TCATCGACCG	GCTGACCTTC	AATAAACACC	TTATTAAAAT	2220
CGCAATAGTA	ACAAATATGC	TCGCAAAACG	GTATGTGGAT	ATATGCGCCT	GCCATGTTAA	2280
TCCTTCCTCA	CCCGAAAATA	TTGGCGAACG	GTTTGTTTCAT	CTGTCTTTAA	CTGCGCAATC	2340
AAAGCATCGG	CACCGGCAAA	CTTGACCTCA	CCGCGTAAGT	AGTGGTACCA	ACGGACTTGA	2400
ACCGTTTTAC	CATAGATCAT	CTGGTTAAAA	TCAAGCAGGT	TAATTTCAAG	CGTTACCGCC	2460
CGATCATCTC	CAAATGTGAC	ATTGCGGCCA	ATTGAAGCCA	TTCCTAAGTA	CCAAGTATCA	2520
TCAACTTTGA	CGGTCACGGC	ATAGATGCCA	ATACCCGGAA	GCCGTTGTTG	CCCCAAAGTG	2580
GCTAAATTGA	TCGTCGGGAA	GCCAAGTAAA	CGGCCGCGTG	CTTCACCATG	AACCACTTTG	2640
CCAGTTGTCA	GATAGACATA	GCCCAGTAAC	TCGTTGGCTG	TGTCAATGTC	ACCACGGTCT	2700
AAGGCATCTC	GAATACGGGT	CGAACTGATC	TTTTTTCCCG	TCCTCAACCA	GCTTAAGGAA	2760
CACTTGACGA	CTTTAAAAGG	CGACCCGGGC	GCATTATTCC	GGGCCATTAA	TTGCCATATT	2820
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<211> 4399

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 17

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AAGAATTCAA	CCACTGTTCC	AGCTGGAACG	AAGAACAGTT	TCGCTTCCTT	TTCAGCATTA	180
AATTGGCCAT	TATGCATTTG	ACCACGTTTA	CCGATGACCA	TGACCACATC	GGTGAAGAAG	240
ACATTCACCT	CGTGCCCTTG	ATGAAATTCA	ACAGCAGTTA	AGGCGTCAGC	GTGACCTGCG	300
CATTCACCCG	CTTCAATCGG	TAAGCCAGCG	TAAACATCAC	GACCGATTGG	CTGCACAAC	360
GGAATTTTTT	CGATTTCGGG	GTTTGAGGGA	ACATAGAGAT	TTGCCTCAGT	TGATGCAGGG	420
ATGGTGACGT	GCTGATCCAT	GAAAGTCTTT	AGTTCGCTAA	CATCATATTG	AGTATAAGCA	480
ACGCCATAGT	CCTCAAAAAC	GGACTCATCT	AGGCTATGGA	TCGTTTTGTT	GGGATTAATA	540
GTTCTGATTT	GATCGATGGT	TGACATAGGA	TGGCTTCTTT	CTGAGTGTTA	AGTTAATAGG	600
ACTCGATTGA	GACTTTAGCA	AAATATTTCG	CAAATTTGGC	AGGATCGACA	AAGCCGGTTT	660
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ACTTGCCATC	ATGAATACCC	ATTGCGAGGC	CGGCCAAGGT	TGAATCACCA	GAACCCACCG	780
GATTAACCAC	TTTGATCTTT	GGAATTGCCG	CGTGATAGAA	TTTGTCTAAA	TGTTTGACAA	840
ATGCGCCAGC	CGATCCTAAG	GAAACAACAA	TCCAATCGAC	ACCAGCAAAA	ATTGGATCCA	900
TCAAATCTTG	TTTCAATGCA	GCATAGTCGG	TTTTGTCTGAC	TTCACGTTGA	AGTAAACCAG	960
CTAATTCCTC	TTCAATTTGG	TTAATAAGCA	GTGGTTTTAC	CGGTGCTTCT	AAAGCGGATT	1020
TTAAAGTGGC	ACCTGATGTA	TCTAGCAACA	CTTTGACGTT	TTTCTTACCG	GCGTGAGCGA	1080
TCATTTGGGT	GTAATAATCA	GTTGGCAATC	CCTGAGGCAT	AGAACCTGAA	ATGGTGATCA	1140
AGTCACTTTT	ATCAAGCAAC	GCGTCAAAAAT	GGTTTAGGAA	TTTCTGAGCG	TCCTCCTCGG	1200
CAATCGTTGG	TCCAGGCTCC	AAAATCTCTG	TTGTTTTGCC	ACCATCATGC	AACACTGCAA	1260
TCGAACTACG	AGTTTCGGCA	TTGATTGGGA	AAAAGTCGTG	GGCGATTCCG	TCTTGATCAA	1320
GCTGATTTTC	CAACCATTTG	CCAAAATATC	CGCCAATGAA	ACCAGTTGCT	GTGATCTTGT	1380
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TCGATGGGTT	TAAAGTGACC	GTTAAAATCA	TGGGTTTTTC	CTCCAAAAAT	GTGATAATGA	1560
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GTATCCGCTA	AAACCTTGTT	CAAACGATCG	ATGTTAGCTT	TACCTTCCGT	TTCCAGCCAT	1740
TGCTTGCCGG	CAGCTTCGCC	TTCAGCAGCA	AATGGCTTAA	CGCCTGGCTT	CCAGGTTGCC	1800
CGGCCGCAAA	GCACACCGTT	AAAGGTTGAA	CCGGCTTCCT	TAGCGAATTT	GAGTTCTTCA	1860

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TCGGTGAAGC	CTTCAACAAA	CTTCTGATCA	ACCGGGACTT	CGACTTTTAG	AACGGAGACA	2040
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GCCCATGCAG	CGGTGCCGGT	TTCGTTGGTC	TTGCCATCGT	AAGAAACCAG	TTCCAGGAAC	2160
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CCTTCGTTCT	TGATGCGCAA	AGCACTTTGG	TTATCGATCA	AATCCGGGAA	GCGGCCAGGT	2340
TCAGTCGCAT	CGTAGCCGGT	TTTTTCATAG	GACAGAAGCA	AGCCGGCTTG	CGGTGCACGA	2400
ACTTTGGCAG	CTGGCAGGCC	ATATTCCGGA	TCAAGCAAAA	TTGAACTGGC	ATATTTGGTT	2460
AGTTCCTCAG	AAACCGCTTT	CTTGAAATCG	ACAATAGTGG	TTTCATCAGC	TGGCTTGTTT	2520
GCTGCAGCTG	CAAGCATTTT	CTTTAAAGAA	CCGCGTTGAT	CGATGGCTAA	CGCTGAGATA	2580
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CATCCAGATA	AGCTTTGACA	ATATCTTGAA	TGAGGTGAAC	GCCGACAAC	GCGCCACCGA	2880
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ACATAGCCGC	GCGGATGCCT	TCGTTTTTAT	CTGCGGCTGT	TGAAATACCG	ATACCTGTAC	3000
CGCACATCAC	GATGCCGAGA	TCTGCACGAC	CATCAGCAAC	ATCTTCGGCG	ACCTTCTTAC	3060
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CCATGTCTTT	TAACATGTTT	GAAATTTCAA	TCTTTTGCAT	CGTGACGATG	TGATCGTTAC	3180
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GCGGTAAACCA	TGCCTTTGAC	TTTGTTAGAA	GCCATGGCAG	AACCGACACC	GTAACGATCA	3480
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TCAACAAAAT	CTTCGGCTGG	TTCAGGCGTC	ACATCCGCGA	CCCGATATTG	ATGTTCTCTC	3600
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TCCATGATCT	ATTCTCCTTT	TTTTGTTTTG	TCTGTAATAA	CATGCGTATA	TGTGTTGTAA	3720
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TCGTAGAAAC	TGTAGAAATC	TTGCCGATTA	AGTTTGAAAT	GATCCGCAGC	AACAAATTTT	3840
ATCCCCGCAT	TGTTCAACGC	AATTCGCTGC	GTCTGACCTT	CTTCGGGGCT	GGCGTTACTA	3900
ATGTGATTGT	CAGCGATACC	GTTAACACTG	ATGAATGCTT	TGGTCGTTGT	GAGGTGAGCT	3960
AACATCTCAT	TTGCCAAGCT	TCCGATAAAG	GCTCCTGATC	GTTTCGCGAG	CTGGCCGCCG	4020
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CCGGGCCCGA	TATAAATCGT	ATCGCCTGAA	GTGATGATAT	CAGCAATGGT	AGCGGCGATT	4200
TTACGCTTTT	CGTTGACGTG	AATGGACCGC	TTCTCATTTT	TGGACAATTC	GGTTAGCGGT	4260
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<211> 2432

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 18

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TCCAACGGGT	TCAATCCTGC	CCTCCGCACC	CAACTTGTGG	ACAAGCTGCA	AACTGTTAGT	180
GGGATACTCG	CGGTCAGCTT	CGTTGATGGT	CGGTATGCTG	GCAGCAATAT	TATTGTGCGAA	240
GCCGAAATCG	TGTTCCCAAG	CGGTGATAGC	CTCGCCAAAT	CCTACCGCAT	CTGCAAAAGT	300
GCCGAGCAAG	TCTTCCAAAG	TGACTTTCCA	GTGCTGTACT	GTTGCATTCA	GGTCAAACCC	360
AACTTACCCA	AAAATATATC	TAGATGATGA	GCTCCACCA	CACTTGCCAG	CGTAGAGAAG	420

TGACTAACAC	TTAAAAAGCA	CAAGCCACAG	ACAGAATGAG	TTCTGGCTGC	AGCTTGTGCT	480
TGTTTAGGTT	CAAAATCGAC	TAGGCTTCGA	GCTTTTCTTT	GTTTGAATCC	GCCACATAAT	540
GCGGAATCTC	ATCATCAATG	AAATAAACCT	TATACCAAAC	TAAGAAGGTA	TAAATCGTCC	600
AAACTTTGCG	GCGATCATTG	CGCTCTTTGC	GGTAAGTCTT	ATCGAGAATA	TCCAAAATTG	660
CGTCTTGATC	AAAGAACTCT	TTAACCCAGT	CTTGCTCAAA	TGTTTCGCGA	ACCTTTTAT	720
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TCGCCCATT	TTCTGGCAAG	TGACGGTTGG	CAGCTTCACG	CAAGGCGTAC	TTAGAATTGT	840
GCGAGTTGAT	CAGATATTTG	GTTGGAATAC	CAGCCGCCAC	TTTGGCAACT	TCCTTATCCA	900
AAAACGGTAC	CCGCAGTTCC	ATAGAGTTGG	CCATCGACAG	CTTGTCGGCC	TTCAACAAAA	960
TATCCTTAGG	CATGAAGTGG	TGAATATCAA	GGTACTGCAT	CTTCTTGACT	TCATCATCGT	1020
AATGGCGCAC	CTTTTTGTAC	GATTCCGTTA	CGATATCACG	AACACTCTTA	CTCTGGCGGA	1080
ATTCCGGCTG	CAAGATCTCA	TCGGCCTGGC	CTTCATGGAA	AACTAAGGCC	TCACCAATGA	1140
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TCTTCTTCAA	CCCATGGGCA	ATGCGGTACT	TCACGCCGCG	CGGTAACCTG	CGCAAGCCGT	1260
CCGCGAAGAC	CCGAATCGCA	TGGCTGCGGG	TGTGAAAACC	ATAGTTAGCA	TACCCGGCAA	1320
AAAGTTCGTC	GGCCCCCTTCA	CCAGACAAAA	TAACCGTCAC	ATCTTTGTGA	GCCAGTCTTG	1380
TCAGGAAGTA	TAACGGCACG	CAGGAAGGGT	TGGAATCCGG	TTCGTCCAAA	TGATATTGAA	1440
TCAACGGA	GTTATCCAAA	GCCTCTTTTT	CCGTCACAAT	ATCACTGGTG	TTATCTAAGC	1500
CCAGTTTGTC	GCTAAGTTCC	TTCGCAGCGA	CCCCTTCATG	ATACTTCTTG	TTGTCAAAGC	1560
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TATCCCAGTA	CTTCTTAATC	GTGAGTTCAT	TATCCTTCAA	CGTGAAGTAA	TGACCTTCCG	1800
GAATGCGATA	AACGCCTTTG	AAGAAAGTTT	CGTCCAACGC	GGAGTACTGG	AAGGTCAAAT	1860
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TGATTTCACT	ACCGACGATG	AACGTGTGCG	CATCTGGTGA	GTAATACATC	GGCTTAATCC	1980
CAAAGAAGT	CCGGGACCCA	AACATTTCTT	TCTTGTTGTC	ATCCCAAATC	AGGAAAGCAA	2040
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GCACCTCGGT	GTCGGAATGG	GTCTTAAACA	CATGTCCGGC	AGCAATCAAA	TCTTTGCGAA	2160
TGCTCTGAAA	ATTATAGATT	TCCCCATTAA	AGATAATCGC	AACAGTACCG	TCTTCGTTCA	2220
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CATCATCATT	GATATATTCG	CCACTCGAAT	TCGGCCCCCG	GTGTTTGATC	ATATCCATCA	2340
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<211> 1216

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 19

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ACTAGAAAAT	GGGCCAAAAC	AGATTGAAAT	CAAATCATTT	CCTGATCCAG	TGATTCAAGG	180
TGATGAGATT	TTAATGAAGA	TAAGAGCCAA	TGGATTATGC	CAAAATGACG	TTCGCGATTA	240
TACGGGTGAT	ACAAAATGGA	CTTATCCGCG	AGTCGGTGGT	CACGAATTCA	GCGGCGAAAT	300
TATTGCAGTT	GGCAACGCTG	TTAATCCCAA	GCATTTTCAA	GTAGGCGACC	ACGTTGTGAA	360
ATATATTCTG	CCAAACTGTG	GTGAATGCTA	TTATTGCAAA	ACTGGCCGGC	CAAATTTATG	420
TACGGAAATA	TACTCGTCAC	CAACATTTCA	CAACGACTAC	GGCATTTCCG	GTTTCTGGGG	480
GATGTCTCAG	TTGATGGCCG	TTAAGACAAC	TGACTTGTTT	AAATATCCTC	ATACGACGTC	540
TTTCTTGAT	ATGGCCTTTA	CGGAACCTTT	AGGATGTGTG	ATTAACAGTG	TCGAACGGGC	600
GAACGTGCAG	CTTGGCCAAG	ATGCCTTGGT	TATTGGCGGC	GGCGTGATGG	GTTTGTTACA	660
CGTGATGACT	TTGAAGTTAA	AGGGAGCGCG	CGTTCTGGTT	AGCGAACCCA	ATGAAAACCG	720
GCGCCGATTA	GCGCTAGAAC	TGGGGGCAGA	TTTTGTTTTT	GATCCTATGC	AGAAAGATCC	780
GTTTGCCTTA	GTCAAGAATG	AAACGGATGG	TCGCGGTGCT	GATGTTGTCT	TTAATACAAC	840
CGCAGTGCCG	GCAATTGCTA	AACAGGCTAT	TGCCTTTACA	GCCAATGGCG	GCCAAACTTT	900
CATGTTTAGT	TCGATGCATC	CAGACGATCC	CGTTTCAATT	GATCTCGGTG	CCGTGCATGC	960



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TCAGCTTATA	AGCAAAAAAG	CACTCAATCT	GCGGCCGTTG	TTGGATAAGA	CGTTCCCATA	1080
CACGGATGCT	GAAAGCGCGT	TTCAATATGC	TATGCTGCCA	GAAACGCTGA	AGACGATGGT	1140
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<211> 853

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 20

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TCCATTGGCG	GCTTGGCTGG	TCATCGCTTT	TTTTGCGGTT	GGTTCAATGT	TGGTTGTCAG	180
CTCGTATTGG	TCGCAACGGC	AAGCCGAAGT	TTCACAACGC	CAAGCAATTG	TCGATAAGAA	240
GGCGGCTGAA	AAAGCGAAGA	AAGAGGCTTT	TATCAAGCGA	TTGGTACCGA	CAGCCCAGGC	300
CATGCAGAAA	CAGTATGGCG	TCTTGACGAG	CATTACGCTG	GCCCAGGCGA	TTCTTGAGTC	360
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GGATCCTGCC	ACCACGAAAAG	TATTACGGAC	GAAGGAATAC	GTTAATGACA	AATGGATCAC	480
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GCTATTCGTT	AACGGTACCG	ACTGGAATCC	GCAGCAGTAT	GCAACGGTGC	GGGCCGCAAA	600
AGATTATAAG	ACTGCCGCTT	CGGCTTTGCA	GACGGATGGG	TATGCTACTG	ATCCGGATTA	660
TCCCCAGAAG	CTGATTCATT	TGATCGAAGC	ATGGAATCTG	ACCCAGTATG	ACAATTGAAT	720
GTTTCGTATTT	TGTTGATTAT	TGAATCCTCG	TTATTTGGTT	ATGGTAGCGC	CAAATTGCGG	780
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853

<210> 21

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<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 21

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GATATGGTCA	CCGATTCATC	CTTACGAAAC	GCGATTACGG	CAGCCGGCTA	TCACTACTCA	240
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TGGAATAGTG	AAGCTCAGGC	CACTTTTGGC	AACTCCGACT	ACTGGCCTAA	TTCCGGTACC	360
GGAATCGGTG	GAGCAGGCAG	CTCATTAGAA	ATGGCCAACA	CCATTGTGAA	AGGCTTTACC	420
GATTCACGGC	GGACGAATTT	TATCTACCAA	CCGGCAATTG	CGGCTTTCTA	TGAAGGCGGT	480
CAATATTCAT	CTAAGAGTGT	CCTGCAGGCA	ACCGATCCAT	GGTCAGGGTG	GACGAATAGT	540
GATGTTGCGA	TTGATGTGCT	TGCCCCAATC	AGTAAATTTG	CCAAACTTGG	TTGGGAAAAT	600
AGCGACAATA	CGTCGGGTAT	CTGGCGCGCC	GTATCTCAGG	CAAGTGTTTC	TACGGCAACG	660
GGTTCCAATA	ATGTCAACGG	CCGCAACGGT	TTGGCTAACT	ATTTAACCCCT	TGCTTCACCG	720
GATAAAAAAG	ATTTTTCAC	GGTTATCGTC	AATGATAGTA	AGTACACGAA	ACACTATCAG	780
ATCTCGGCTT	CCAACATGGC	TTATAAAGGA	ACCCCGACCC	TTGAAGAATG	GGAAACACGG	840
GCAGCTGATA	CGACTGCAAA	AGATGCGTAT	GACAGCAATT	ACCTCAAACA	TGTTGGCGAT	900
GTCCAAGCTG	ATAGCAAAGG	TGTTTATACC	GTTACGGTTA	AACCATTTTC	AATCAAGACG	960
GTCACCACGC	TTGATAAGGC	AAAGGATTCC	GATTTGAACC	AAGGTATATC	GGCTTCATCG	1020
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ATGAAGATGC	CATCATAGTC	AAAATGGATC	ATCCGTCCGC	CATGTTCCAG	CTCTTTGGTG	2760
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<220>

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CTGACACGGC	GGATTTGCCG	ATTTTTGATC	AAATCTTCAC	CCGCATTGGC	GCTGCCGATG	360
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GTCATGCAAC	CGCATCGAGT	TTGATCCTGT	TTGACGAAAT	CGGTCGCGGC	ACGGCAACGT	480
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<212> DNA

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<400> 25

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&lt;211&gt; 3497

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GGTATGTGAC	TCCGTATGGC	GATATTCATG	CCTTAGCGGA	GAAGATTTCAG	TTATTGCTAT	3360
CCGATCGTGA	CAAGATGCAG	CAGATGAGTA	CGAATGCATA	CGAATCTGCT	AACAGATATT	3420
CTGAAGAAAA	TGTTTGGAAG	AAATGGCACA	AAGTTTAAAT	GGATGCACAA	AAGAGTGAGG	3480
GGGAAGTGAC	GAAATGA					3497

<210> 27

<211> 884

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 27

CCCGGCGCAG	AAGTCTGCGT	GTAAGGACCT	TGGTCGCAAT	GGCCAAAACC	GGGCCATCAC	60
GCCCAAGGCC	GCTTACACTC	CGACTTCTAA	CCGCGCCGGC	TCGCGCTCAC	TTTTCTAGGA	120
GGTTTATCAT	GCGTACAGCA	ACGATCACTC	GGACAATAA	GGAAACCGCG	ATAACGATTA	180
GTTTGAACCT	TGACCAGCAA	AGCGGTATTG	ATATTGATAC	CGGCATTGGG	TTCTTCGATC	240
ATATGCTTGA	TGCTTTTGCT	AAACATGGAC	GCTTTGGTTT	AATCGTTAAA	GCTCAAGGTG	300
ATTTAGACGT	GGATCCGCAT	CATACGATTG	AAGATACAGG	CATCGTCTTG	GGAAGTTGCT	360
TTAAACAAAC	GCTGGGTGAC	AAAGCTGGCA	TCGAACGCTT	TGGCAACGCA	TTTGTGCCGA	420
TGGATGAAAG	CCTTGCCCGC	GTGGTGGTGG	ATCTTTCGGG	GCGTGCTTAT	CTTGTGTTTG	480
ATGCTGAATT	AACCAATCAA	CGACTCGGAG	GATTTGATAC	GGAAGTGACG	GAAGATTTTT	540
TCCAGGCTAT	GGCCTTTGCA	GGTGAATTCA	ATCTCCATGC	CGCTGTTTTA	TACGGGCGTA	600
ATACGCATCA	TAAAATTGAA	GCGTTGTTTA	AAGCATTGGG	CCGTAGCATG	CAGGCGGCGG	660
TGGCGCTGAA	TCCGGCAGTG	AAGGGGATTC	CCTCAACCAA	AGGAGTGATT	TCATGATTGT	720
GATCGTTGAC	TACGATACGG	GCAACACGTT	GAATGTCAAA	AAAGCGCTTG	ATTATCTGGC	780
TATTGACAAC	CAACTTTCAG	CTGATCCTGC	CGTCATTCTG	GCTGCAGCCG	GTTTAATCCT	840
GCCAGGAGTG	GGAGCTTTTA	AAACCGCCAT	GTCTGCATTG	ACCC		884

<210> 28

<211> 1226

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 28

CGACTATGAC	CATCCGAAGT	TTAATTGGAA	GAAAACGCAG	CGAACGATTT	TTGATAATTG	60
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TATTATGGTA	ACAGCAGCAG	ATAATATTAC	AGGTTTAATT	GGCAATACGC	CGCTACTCAA	180
GCTCAATCGC	GTTGTACCTG	AAGGCGCCGC	GGATGTTTAT	GTCAAGCTGG	AATTCTTTAA	240
TCCCGGCGGC	TCAGTCAAGG	ACCGGATTGC	CTTGCCGATG	ATTGAAGACG	CTGAATATAA	300
AGGGTCTTTG	AAGCCAGGCG	GCACCATTTG	TGAGCCAACG	TCCGGCAACA	CCGGCATTGG	360
ACTGGCATCG	GTTGCGGCGG	CAAAAGGTTA	TCACCTCATC	ATCACCATGC	CGGAAACGAT	420
GAGTGTTGAG	CGGCGTGCTT	TGATGCGTGG	TTACGGAGCC	GAACCTATTT	TGACGCCGGG	480
TGCCGATGGA	ATGCCGGGAG	CAATTAAAAA	AGCAGAAGCA	TTAAGCAAGG	AAAATGGCTA	540
CTTCTTGCCA	ATGCAATTCC	AGAACCCCGC	CAATCCAGAC	GTCCACGAGC	GCACGACCGG	600
ACAAGAAATC	ATCCGTTTCAT	TTGATGGTGG	CACCCAGAT	GCCTTTGTAG	CCGGCGTCGG	660
CACAGGCGGA	ACACTCACCG	GGGTGCGTCG	GGCTCTGCGT	AAGATCAATC	CAGATGTACA	720
AATCTATGCG	TTGGAAGCAG	CGGAGTCGCC	AATGCTAAAA	GAAGGCCATG	GCGGCAAGCA	780
CAAGATTCAA	GGGATCTCAG	CCGGTTTTAT	TCCAGACGTC	TTAGATACGA	ACCTCTATCA	840
AGACATCATT	GAAGTCACCA	GCGATCAAGC	TATCGACATG	GCTCGCCACG	TCAGCCATGA	900
AGAAGGCTTC	CTACCAGGCA	TTTCCGCTGG	CGCTAACATT	TTTGGCGCGA	TTGAAATCGC	960
CAAGAAACTC	GGCAAAGGCA	AGAGTGTCGC	CACTGTAGCA	CCGGATAATG	GTGAACGGTA	1020
TTTGTCGACG	GATTTGTTTA	AGTTTGATGA	TTAGTAAAAA	CAATAGCTAT	AGGTAAGCAA	1080

AAAACAGAAG	CGGCGATCAA	TTGAGTCAGT	TGATCGTCGC	TTTTTGTCTT	GAGAAAATGA	1140
GCGGCAGGGA	AGATTGCGTG	CGTCAACATT	GAACAAGATT	GTTATAATGG	AATCTGTAAG	1200
TCTCCATGGT	GCAATGGATA	GCATAA				1226

<210> 29

<211> 3522

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 29

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GGTGACACAG	TTTGAGCAAA	AAAATGCTTT	GGAAGGATAT	ACGCAAATCC	TTTACAACGT	120
CATGGGGCCG	ATTTTCTCTG	ATCTTGCTTT	TGATGATGCT	TGGGTCATTT	GCCTTGGTCG	180
GGTTATGGGT	TGCCGGTCCG	GATATGCGAG	CAACAGGCGC	AACCTATTTT	AAACAATATA	240
ATTTGGCCGA	TTTAACCGTC	ATTGGTGAAG	ATGGTTTGGA	TAGCCACGAT	CAAAAGACGA	300
TTCAGGCGAC	AGCTGGCGCA	AAGCAGGTTG	AATTCCGTTA	TCTTAAAGAT	GTCACGCTCA	360
AAGGCACGCA	TGCTAGTTTT	CGGATTATGT	CAAAACCGGA	TAAGATCTCA	AAATATAAGC	420
TTGCTTCCGG	ACACATGCCG	ACTAAGACGA	ATGAAATTGC	AATCGATGCT	AACTACAAAG	480
GCAAATATAA	GTTAGGCGAC	ACGATTAAAGT	TTGTGCAACG	AGCGGATCAA	ACCGGCAGCA	540
AGGTGCTTAA	GCGGACGCAA	TTCAAGATTG	TCGGGTTTGT	CTATTGCGCT	GAAGTCCTGT	600
CCGCCATTAA	CAAAGGCGAC	AGTACTTCGG	GTAGCGGTGA	TCTCAAAGGA	TACGGGGTCG	660
TCACAGCGAA	TAACTTCGAT	AGCGACTTTT	ATATGATGGC	GCGGATCAGC	TATCAAAATA	720
CCCAGAAGCT	GGATCCGTAT	TCCGATCAAT	ATACCGATCG	GATTCAAAGT	CATAAAACGG	780
CTTTGAACCA	ACGATTGAAA	GATGCGCCTG	CAGATCGCTT	GGCGGCTATC	AAAAAGCAAT	840
ACCAAAAGAA	GATTGATGCG	GGTCAAAAAA	AGCTTGATGA	AGCTAAGGCA	CAGTTAGACT	900
CGGCTAAGGA	ACAGCTGACA	ACCGGCCAGC	AGCAATTAGC	CAGTGCCAAG	CAGCAAATTA	960
CGGCAAGACA	ACAGGAACCT	GATACGGCCG	TTAAAAATGG	CCAAGCACAA	ATTGCCAGCG	1020
GGGAAGCACA	GTTACAACAA	GCAGCGACTC	AACTTTTACA	AAGCGAGTTG	CAACTAGCCA	1080
GTGCCAAACA	ACAACCTGAA	GCCAGTCAGC	AACAACCTGA	TGCCAAACAT	CAAGATCTTG	1140
CCAGTGCCAA	GCAACAATTG	GATACTGCCA	ATCAGCAGCT	TGCTAACAGT	CAGGCGCAGT	1200
TGGCTGCCGC	TAAACAAGAA	ATTGACGCAG	CGCTGACGAA	TAATCCGCAA	ATCGCTCAGG	1260
TGCCAGTATT	CCAGCAGAAA	CAGGCGCAAT	ATCAAAATGG	CATCGCGCAG	TATAACCAAG	1320
GCCTTGAACA	ATATCAAAAT	AATTTACAGG	CCTATAACAA	TCAAGTTGCA	GCCTGGAATA	1380
CGGCCAATAA	CCAGCTTCAA	CAAAAGTACC	AAGAATATAA	TTCTGGCGCG	AGTCAATTCC	1440
AACAAGGCCA	GCAATCCTAT	GCGGCTAAGC	AACAAGAATT	AGAACAAGCT	AAGCAGTCAT	1500
TGGCGACTCA	GCAGCAGTCG	GGACAGCAAC	AAATTGAGGC	AGCTAAGCAA	GAAATGGCCT	1560
CAAACGAAGC	AACGCTCAAA	ACCAAGCAGG	CTGAATATGA	TCAGCAAGCG	CCAAACGCAG	1620
AAAAAGAAAT	CCAAAGTAAC	AGTCTTAAAC	TTGAGGATGC	TAAAGAAGCG	CTGAAAAATC	1680
TTAAAGCACC	TACGTACACG	GTTGACACTC	GTCGTGAAAC	TCCAAGTGGG	CAAGGCTACA	1740
TGGTTTATGA	CAACACTTCA	AATATCATTG	ATTCGCTAGC	CAATATTTTC	CCATTTTTC	1800
TGTACTTTGT	CGCAGCGTTG	GTTACTTTTA	CCACTATGAT	GCGGTTTCGT	GATGAAGAAC	1860
GTATCAATTC	CGGTACATTG	GTTGCACTAG	GGTATAGTCG	GCATGATGTC	ATCAAAAAGT	1920
TTACAGTGTA	TGGTTTCCTG	TCCAGCTTAA	TCGGTTCGAT	ATTAGGGATC	ATCAGTGGAC	1980
ATATCTTACT	GCCATTGATT	GTGTACAATG	CCTACCATTG	CGGGGTTAAT	GTTCCGCCAA	2040
TCGAATTGCA	TTTTTATCCC	GGCATTAGTA	TTGCGGCGTT	GTTACTTGCG	ATGATCAGTG	2100
CGGTTCTGCC	TGCAATGGTG	GTTGCCCGGC	GCGAACTGAA	AGAACGGCCG	GCTCAGCTGC	2160
TTTTTGCCAA	ACCGCTTGCA	AACGGCTCAA	AGATTCTGCT	TGAACGGGTC	GGCTTTATCT	2220
GGAAGCGTAT	GAGCTTTACG	CATAAAGTGA	CGGCGCGGAA	CATTTTCCGG	TATAAGAAGC	2280
GCATGTTTAT	GACGATCTTC	GGGGTTGCCG	GATCAGTGAC	CTTGCTGTTT	TCCGGCTTAG	2340
CGGTTTCAGCA	CAGTATCGGC	GGGGTTAATG	ATCGGCAGTT	CAACGACATT	ATCAAATACG	2400
ATATGATCGT	GGCACAAAAA	GACAATATCA	CCAAGAATCA	ACAAACAAGT	CTGGATAAGC	2460
TTTTTTAACGA	AAAAGCGGTT	AAGAAGACGA	AATCAGTTCA	TTACGAAACC	GTCAGCAAAA	2520
ACGCTGGCGC	CAATCATGAT	CGGCAAGATA	TCACCATGAT	TGTGCCGCAG	TCAACGAAGA	2580
ATTTTGACAG	CTACATTCAT	TTAGCAACGC	GCAAAGGCCA	AAACAAACTG	ACCCTTCAAG	2640
ATAATGGCGG	CATTATTTCC	GAGCGGCTGG	CGAAACTGTT	AAATGTCGAT	GTCGGGGATA	2700
CGATCACCGT	TAAAGAAGCA	GATGGTACCC	GTCGCAAAAGT	CAAGATAACC	GGCATTACCG	2760
AAATGTATAT	GGGTCACCTC	TTATTTCATGA	ACAAAACAGC	TTACCAAAAA	GCCTTTAATA	2820

CCAATTACAA	GGTCAATGGG	CATTTGGTTA	CCTTAAATGA	TCGGTCTATC	AGTAATACCC	2880
GGGCCCATGC	CGCGCAATTC	ATGAAAGAAG	ATGGCGTTAA	AGGCGTGGTT	CAGAATTCTT	2940
CTTTGAGGAA	TCAAAATTACG	ACAGTTGTGA	AATCGTTGAA	CAAGATTATG	GGCGTTTTGA	3000
TTGTGTTGGC	AGCTGTTCTC	GGCGTCGTGA	TCTTGATATA	CCTGACGAAC	ATTAACGTTG	3060
CTGAGCGGAT	GAGGGAACCT	TCAACTATCA	AGGTCCTAGG	GTTTTATGAT	AAGGAAGTCA	3120
CACTCTATAT	TTATCGCGAA	ACGATCCTGC	TTTCGATTAT	TGGGATTTTT	GTCGGCTGGG	3180
GTTTTGGTGA	ACTCTTGCAT	GAGTATATTA	TCACCGTCGT	TCCGCCAAAT	AACGTCATGT	3240
TCAATCCCGC	CCTTTCAGCG	CCAACCTTCA	TTATTCCAAC	CATCGTGATT	AACATCATCA	3300
CCGTTTGCAT	TGGGTTCTTC	GTCAATTACT	CGTTGAAGAG	AGTGAATATG	TTAGAAGCAC	3360
TGCAATCAGT	TGATTGATGT	GGCTTGAGGT	CTTTCCCCAA	GCGTTCTAAA	AAGAAACAGG	3420
TGGCTTAAGT	TGGAAAAAGA	CCATTGATTT	CGCTATCGCA	TCGGAAACGG	TGTCGAGCAG	3480
TCTCCTCGCA	GTGSCTGAGT	TGARGKTGCT	CGATTTTCGT	GA		3522

<210> 30

<211> 1106

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 30

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GGTGCCCTGTC	GTTGCAAGCG	GCGGTGCCGG	ATCCGCAAAT	GACTTTGTTG	CCTTATTCCG	120
TAATACGAAT	GTTTCTGCGG	GACTCGCTGC	TTCAATCTTC	CACTTCGGCG	AATTAACGAT	180
ACCGCAAGTC	AAGACAGTTC	TAAAACAAGC	AAAGGTGGCG	ATTCGATGAT	ACCACTCGAT	240
TTTAAAAAGG	CGTCCGGTTT	AATCACAACC	GTCATTCAAG	ACGCAACGAC	CAAGCAAGTA	300
TTAATGGTTG	CCTATATGAA	TGCCGAAAGC	CTTGAGAAAA	CGATGACCAC	CGGTGAAACC	360
TGGTTTTGGT	CGCGCAGTGC	GAACATGCTA	TGGCATAAAG	GCGAAACCAG	CGGCAACACC	420
CAAACGGTTC	AAGCTATCGC	CGTTGACTGT	GATGCGGATA	CCTTACTCAT	CACCGTCAAT	480
CCCGCTGGTC	CCGCTTGCCA	CACTGGCCAC	ACCAGTTGTT	TTTATCGTCA	GTATACAGAA	540
AGGAAGGGCA	CCCAATGACA	GCTGCCAAAC	AAAGCATTAC	CGAATTATAT	GATCTCATCC	600
AGTCACGGAA	AAGCCAGCCA	GTTTCAGGCT	CATACACCGA	TTATCTTTTC	ACCAAAGGAT	660
TGGACAAGAT	TTTAAAAAAA	GTCGGGGAGG	AAAGCACCGA	GGTCATTGTT	GCAGCCAAAA	720
ATCCCAGACGA	TGCGGCTTTT	ATACTCGAAG	TTGCCGATCT	GACTTATCAT	GTGCTGGTAC	780
TCATGGTCGA	ACGCGGCATC	TCCCTTGATC	AGATTGCGAC	TGAACTGGCG	AGCCGTGAAG	840
GAAAAATGAG	TCGCTTAAAA	GAGCGCGATA	AAATCAACAA	ATATTGACAA	CCGATTGCCA	900
GCCAGCGCTC	ACGTTTGAAG	CTCGGCCAAA	CCAAACAAGA	TCACAAGGAG	GCGTTGTTTA	960
TGTTTAAACC	CACCATTCAT	CAACTTCATC	CCTATACGCC	AGAAAAGCCT	CTTGCCGTAT	1020
TAAAAGAAGA	ACTTGGCTTG	CCACAGCTGG	TGCGGATGTC	AGCAAACGAA	AACCCATTCC	1080
GTACCAGCGT	CAAAGTTCAG	CAGGCC				1106

<210> 31

<211> 982

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 31

CGCGCAATAC	CCGATTTGTT	AGCTAAAGAC	CATTTATAAC	CAGCATGTCA	TCAGTCGATT	60
CAAGAAAGGT	ATTGGGATGA	AAAAGATTTG	GTTGGGATTG	GGTGTTTTAC	TATTGTTACT	120
AGCGGCTGGC	TGTGGGGTTT	CGCGGCAAGC	TGCTAAGTCA	AGCCGCTCCT	CTGCGCCAGT	180
TCGCAGTCGG	CAGGCCAGCG	CCACTTCAAC	GCCGCCGCGC	CCGACTCGCT	TAGCACGATT	240
GAAGGCCAAA	AACAAAGCGC	AGTTAGTTTA	TGCCCCTTTT	GGCGACAGTC	TTTCCGTTGG	300
CCTTTTTTGCC	GATAAAAAAA	CCACCCGCTT	TACGTCGCTT	TTTGCCCGGC	AACTGGCCCA	360
ATTAACCTGGC	AAAACCTGTCA	CCGAAGCTGG	CATTGCGGAA	GTAGGGAAAA	CGGCTACTAA	420
TTTGGGCGTC	CCAGCCTTGT	CACAACTCGT	CGCCCAGCAT	CCCGATGTGG	TTACTATCGA	480
GTTTGGCACC	AATGATGCTG	TCGGTGGCGC	AACCCCTACT	GCACTTAATG	CGTATCAACA	540
GGCGTTAACC	ACCATTGTCA	CCACATTGCA	AAAAGAAACC	TCGGCACAAC	TGATCCTCAT	600
GACAACCTGG	TCGCCAAATC	AAGGGCCATA	TGTTAACGCC	GATTTAAAAT	TCGATGCCGT	660
CGTTAAACG	GTGGGGCAGA	CCTACCAGGT	ACCGGTCGTT	GACTTAGCAA	CCATCTGGCA	720

AGGTCATGAT	GATGTCACCG	GACCAGCTGG	AACCGTCATT	CCGGATTTTT	CTGCAAATGG	780
CCCCCGGGAT	ACATTCCACC	CCAATCAACG	CGGCCATGAT	CAAATTGCTA	CTCAGCTTAT	840
TAACACTTTG	GAGGAACGAT	AAATGCAAAC	ACCGTTAAAA	TTCTGTCCCA	ACTGTGGTCA	900
ACCGATTAA	CCGGATGATG	ACTTTTGTCC	TAAGTGGCGC	TTTGATTTAC	GGTCAGCCCC	960
CCTGCAAGCA	CAGCAAACAA	GC				982

<210> 32

<211> 8995

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 32

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CGGTTACAAA	GACTAGCATC	AGCGTTGCCG	CGATCCACTC	ACCCCATTCG	AGGACACTCA	120
TCAGATCATG	CACTGCGCCA	TTCTGGGCAA	AAGCCGCAAT	ATATTTGGCC	AATGCGGTGG	180
CGGAAATGAC	CAAGGGGAAC	GTGAAGGCCG	CAAACTAGG	GTAAAACGAC	AACCGCGTAT	240
ACTGCCGAAT	ACTAACCAAC	GTAATGAAAT	ATAAACTCTG	CGCAAAAATC	AGCATCCCTG	300
TTGCCAGCCA	GAAGTTAGGG	TGGTCAAAAC	TGGCCAGATA	ACCGGTCAGA	CACAACGAGG	360
CCGGGGCTGC	CATAATGGTT	AATAATGGTT	GAGTCGCTTC	GGGCAAAGGC	ACATGCCGTA	420
ACCGGTGAAG	CACAAACGGA	AACAAGGCAA	CATAAATCAC	CAACGCCATC	CAGAAAAGCG	480
GCTGACCTAG	CGCCGGTACA	AATTGACTGC	TGGTCACCGG	AATCACGCCC	AAGCCAACAA	540
ACGTGACAAA	CCAGCTCGGG	TAAATCATTC	GCCATGCTTT	CGGTTGTGAA	ATCAAATGCC	600
GCAGAACAAA	GAAAATCATC	AACCCAAAGT	GAATCGCCAC	CGCCATCAGC	CAACAATCG	660
TCGCAACCGG	CAACGGCATC	CCCCAAGCAA	CAAAGTAAGT	GCACAAGATC	ATCAGCGTCA	720
TTGAAAAAGT	TGGCGAAACC	GAAGCAATAA	TCGGATCCTT	CAAACCTACCA	GCAGCATGAA	780
GCGGCGTCAA	ACAAAGCTTC	AGCAAAACCA	ATCCAAACAA	CAACCCAGCT	ACGATCCCAG	840
TCAAATCACC	AACCAACTGC	CAACCAGCTA	ATTTATACAA	ATTCCCCAAC	GAAGCCAACC	900
CCAACGTCAA	CCCCGCCATG	GGTAACGGTA	CCTGCTTTAA	AAAATTACGC	ATAACATCCT	960
CCTGAGCGTG	AGCTGGCGCG	GTTAGGGATC	GGAGTGTAAG	TGGCCTTGGG	CGTGATGGTC	1020
GCACTTTGAC	CATTGCGACC	AAGGTCCTTA	CACGCAGATC	CCTGCGCCAG	CGAACGCGTT	1080
ATGAGCGCGA	ACCGGCGCGC	TTAGAAGTCG	GAGTGTAAGT	GGCCTCAGGC	GTGATGGCCC	1140
GCACTTGGCC	ATTGCGACTG	AGGTCCCTTAC	ACGCAGATTT	CTGCGCCGGT	GAGCGCGTTA	1200
TGAGCGTGAG	CTGGCGCGGT	TAGAGATCGG	AGTGTAACG	ACCTTGGGCG	TGATGGCCGC	1260
ACCTTGACCA	TTGACCCAAG	GTCCCCACAC	TCCGATCCCT	ACGCCAGCAA	ACGCATAATC	1320
AATCACATGC	TCCCCAGTCT	AACAAGAACA	GCTAACATCA	ACCAAATGAA	TCTTTTGCAT	1380
CGTTAATATT	CATGAATCGA	ATATTAATCT	CAGAAAAAAG	CGTTGGCAAA	TCAACCTTTC	1440
GCTGATGCCA	ACGCTTATCG	ACTTGTTACT	TGCCACCAGG	ACGACCATCA	ATTTAATAAA	1500
CAAGCTTTTT	TTGACCAAG	TTGATTGGAA	TTAGCGCAAT	TAGTAACAAT	ACAACGAACA	1560
ACCAAACCAG	ATTAGCCAAT	TGACCACTCA	AATTACCATC	AGCTAATCCG	CGAATTAGGC	1620
CCACCGCATG	GGTTAACGGC	GAAAACCAGC	CAACCTGTTT	CAACCAGCTG	GCCACATGAC	1680
TCAACGGGAA	AAACGTGTTT	GAAAACATAA	ACATGGGTTG	AATAACCAAC	ATCGTGTAAT	1740
AGTTCAGATA	ATCTCTGGTA	GGTGCCATCA	GCGTGAAAGC	CAGTCCCAAG	AATCCAAACA	1800
GGGTACCTGT	AATAAACAAA	ACCATTGGA	TTAACATTGC	CCAAAACTG	CTAATGGTTC	1860
CCATCAGTAG	CGCCACTAGC	ATAAATAGTG	TCCCGAAGAT	GACGCTCCGG	ATACCGCCCC	1920
AAATAGCTTG	ACCGACAATG	ATATCCGGCA	GGCTGATTGG	ACCAGTGCTC	ATTTCATAAT	1980
ATGTTTTGTC	TAAATGCATC	TGGATATAGG	CATTAACCGT	ACTTTCATTG	TTGGATGCGT	2040
TCATCGCCGT	CCCAGCAATC	AAACCTAACG	TAATAAACTT	CAAGTAAGGC	ATCCCGTCTA	2100
CTTGGCCAAC	AAAACTGCCT	AAACCCAAAC	CCATCGCTAC	TAAATACAAG	ATCGGATCAA	2160
ACAGATTAGG	AAAAATAGAG	ATTTTAAACA	ACTTCTTGAA	GCTCATCCAA	TCACGATAGA	2220
TCACATGATT	GATGCTTTTA	ATCTTGAGTT	TGTTCAATAT	CTTCCCGCCC	CTCATCAAAA	2280
TTTGTCATTT	TCAAGTAAGC	CTCTTCCAGC	GTGGCATAAC	TATACTTTAG	CGGAAGTTCT	2340
TTAACAGGAG	CTTCTGCTAA	AGCGACGCCA	TGATCAATAA	TCATAACCGT	TGCCCCCCAC	2400
GTTTTTCGATT	TCATTCAACA	TAATTGTGAC	GGTGAAGTAA	AATGGAAAAC	CGCCCCCGTT	2460
TTTTTTTAAAA	ATAATTTGGA	TTCGGTTGCC	CAAAAAAGAA	CCATGTGTCT	TTGAATTGGA	2520
AATATTTCCA	AAGCCCCCGG	GGTGGGGTGG	GGGGGTTCAA	ATTCCCCGGA	AAATTGGAAT	2580
TCACATTTTT	TAAAGAGGAT	CTCAATTTGT	GTATTAAAGG	CGCGCCCCCG	GGCGCCCCAA	2640
GGGACCTTAA	AAACGGGGGG	GAAACCGCAA	TTCCCTTTCC	TTGTGACAGA	AAACTGGGGT	2700

TGGTTGGCTT	TTTATTTTTG	GGGAAATGAG	AACCAACCCC	ACCAAACTT	TAACAATTGC	2760
TCTGCTTTTT	CAGCTGCAGT	TTTAACCGTT	AAATCAAATA	AGATACCATG	AGCGATCATA	2820
TTTTCTTTAA	CGGTCAGCGT	CGTGTCCAGT	AAGTCATCTT	GCATAACCAC	CCCAATCGTC	2880
CTTTTAGCTA	ATCGAGGTTG	TTTGACAATA	TCGATCCCGT	TGATAAAAAT	TTTCCCGGAA	2940
GTAATGGCGG	TCGTGCGATA	AATCATTTTT	AAAGTTGTCTG	ATTTACCAGC	GCCATTAGGT	3000
CCCAAGACAG	CTAACGTTTT	CCCGCGATCC	AAGGACAGTG	AAATCCCTTT	AACTGCCTCA	3060
AAGTTTCCAT	AACGCTTAAC	TACTTTTTCA	ACCTGTAAAA	TTTTCACAGC	CAAACACCTC	3120
CACAAACGAA	ACAAATGTCTG	CTTTTCATGG	GCTTAACATA	CGCCCTTGTT	CTAAATTTTA	3180
GGGCGCAGTC	ATTTCCATGC	GCATCGAAAT	GTGGAATAAT	TAAAGTGCGG	TTATTATTCTG	3240
CCGATGAGGA	GATTCATTTT	ATGGCAAAAG	AATTACCTAA	CATCACCAAG	ATTGCAGTCG	3300
CTTTGTCCAA	TCACTCAAAA	ATGCTAGTCT	TGGACAGTCT	CATGGATAAA	CGCGGTCACA	3360
CGCTTCTAGA	AATAGCCCGC	GAAGCCAACA	TTCAACCTCA	AACTGCCAGT	TATCACTTAC	3420
AGAACTTCAT	TAACAACGGT	TGGGTAAAAA	TGGAATAATC	CGGCCGCTTC	CACTATTTTT	3480
TCCTAGTGAG	TGATCAGGTT	GCCGCACTCA	TCGAACAATT	CAGTCCACTT	TCACCATCAG	3540
CGTCAACCCA	TACCTTAACC	AGAGCCCTTA	AGGTTGATAA	AATGCGGACT	TTCCGTTCTT	3600
GCTACGACCA	TATGGCGGGA	AAAATAGGCG	TTTTGATTAC	CGATCAACTC	TTGGCCGATC	3660
CGCGGAATAA	CTTGATTCGG	GTCGTTAATG	AAATGAAAGA	TGCCGGATTG	ACAGCCTTTA	3720
ACATTGGCCC	TGAACCAGAA	TTCTTCTTGT	TTAAATTAGA	TGAAGACGGC	AATCCGACAA	3780
CGCACTTGAA	TGATCGTGGT	TCATACTTTG	ATTTTGCCCC	GTTAGATATG	GGTGAAAATT	3840
GCCGGCGTGA	TATTGTCTCT	GAATTGGAAA	AGATGGGCTT	TGAAGTCGAA	GCATCTCATC	3900
ACGAAGTTGC	GCCTGGTCAG	CATGAAATTG	ATTTCAAGTA	TGCCGATGCA	CTTGAAGCAG	3960
CTGATAATAT	TCAGACCTTC	AAACTGGTCG	TTAAAACGAT	TGCCCCGAAA	CACGGTCTGT	4020
ATGCAACCTT	CATGCCAAAA	CCGCTTCATG	GTATCAACGG	TAGCGGGATG	CATATTAACA	4080
TGAGTCTTTT	CCACGACAAA	GGCAATGCAT	TCTTTGACCC	GGATACAGGC	GATCAATTGA	4140
GTGAGACGGC	GATGCATTTT	CTTGCCGGTG	TGTTGCGACA	TGCCTATGCG	TTAACTGCTA	4200
TCAATAATCC	AACGGTTAAG	TCTTACAAGC	GGTTAGTCCC	TGGGTTTGAA	GCACCGGTTT	4260
ATGTTGCTTG	GTCTGGCAAG	AACCGGTCAC	CTCTCATTCG	GGTACCGCAA	TCACGTGGCT	4320
TATCAACCCG	GTTTGAATTG	CGCTCGGGTG	ATTCGACTGC	CAATCCATAC	TTAGCGATCG	4380
CTGCCATTCT	TCAAGCTGGT	CTTGACGGGG	TTAAGAACCA	GTTGAAGCCG	GAAGAAGCGG	4440
TAGATCGTAA	CATTTATCGG	ATGCAAGATG	ACGAACGTAA	AGCGAACCAT	ATTCAAGACC	4500
TGCCATCAAC	GCTGCACAAT	GCCTTGAAAG	CATTGGCGGC	TGATGACGTG	GTCAAGGCTG	4560
CCCTGGGTAA	ACATTTGTAT	CAAAGCTTTA	TGGATTCAAA	GAACCTCGAA	TGGTCTGCTT	4620
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CACCCAAAAG	CTGTTGTTGG	CACCCGAAGT	GCTGGCTAGC	TAAAACAGTC	AAGCATTTAA	4740
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CTCACCATAA	CGCGCTCCCC	AGCGTAGGAG	CCTGGGTGTA	AGGACCTTGG	TCGCACACTG	4980
GCCAAAGCCC	GGCCATCACG	CCCAAGGCTA	CTTACACTCC	GACTTCTAAG	CGCGCCGGCT	5040
CGCGCTTATC	ATAACGCGCT	CCCCAGCGCA	GGAACCTGCG	TGTAAGGACC	TTGATCGCAC	5100
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GATTAATCTA	AGTTTGATG	CTTTGTATCG	TCATGCTGAC	GGCGAACATG	AGTGGCAGAT	5940
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GGTTTCCACA	GATAGCGGTT	TTTTACCTGA	AGATCCGCGA	AATCTGGCCT	ATAAAGCGGC	6060
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CGTACAGTCC	GACTTTGTTA	TGGATGTTAG	TGGTGATCAA	CAAAGGCACC	AAAGTTGGTC	8820
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GGATGCCACC	TTTTACCAGA	TCAACTACTT	CACTTGGATT	GGTAAACAAA	TAGAACACTT	180
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TGACTTTCAT	GCCCGGAGGT	GCTGCCTGCT	TTAACAAGGT	CTTACGAATA	TCGTCCTTAT	300
AAACCTCTGA	ACTGACGATG	ATGATACGAT	CCGCATTGTA	TTCTTTAGAC	CAGACTGTTG	360
TAACCTGACC	ATGAATTAAG	CGATCGTCAA	CTCTTGCAAG	CGTAATAATC	ATCAGAAATC	420
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CAATAACATG	GGCAAGCACA	TTCCAGCGAC	AACATCGGCC	GCTTTCTTTT	TCAAAACTAA	600
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CGCCTTTTTA	GGATCAATCG	CTGAAATAAT	TTTATTCGTC	AACGATTGCA	AACCCTCTTT	720
AGGTGTAAAG	TCTATTGGAT	GGAAATTTGG	CACCTCACCA	TAAATCATCT	CCACTGCTTC	780
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TCTCCAATCT	TATAAACATG	TTTTAACCGC	GTGATTTTCC	GCCTGCGACA	TTAGTTGTAA	900
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GGCCAACAGA	ACCTTCTAGA	CCTGCTTCAG	AAGACATATT	CACGATAACT	CCGTGACGTT	1260
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CAACTAAAAC	ACGTGGTTTG	TTAATTCCTG	CGTTATTGAC	AACCCCCCAA	ATCTCCCCGT	1440
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CATCAATGTT	TTTATCAAGA	ATCATTAATA	GTGGTGACGT	AATTGGGTTA	AGTTGGGGTT	2160
CAACGCTTTC	AAGTGTTATC	AGTCAATTTT	CAACAGATAA	AGGCCTTCGT	GATATTAAAG	2220
TTGTTCCGCT	GGTGGGTGGC	CCAATGGGAA	GAATACCTTC	GAACATCAT	GTGAGCTATC	2280
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CCAAAACAAC	CCCCGGGTTT	TCCAATTTCC	CCAACAATGG	GCGCAAAAAA	GCGAGTCAAA	180
ATGGTTGGCG	GCAGCTTCCC	AGCCAAATTC	CAAAAAATA	AGGGGCCGGC	AATAACGCCA	240
CCGCCAGTAA	TGAGTGTGAC	CGGAATCAGC	TCGAACGAAC	GGGAAACAAA	ATCCGGCACC	300
CCATCCGGCA	TCTTGATCGT	TAAGTGGTGA	GTTTTGCACC	AGTGATATAA	CTCAACCGTC	360
AGCAAGGCAA	CAATCATGCC	GGTAAATAAA	CCGCGAGCGC	CAAGGTTGGC	GACATCCAGT	420
TGGCCGGTTT	TGTTAAAAGT	TGCGACCATC	ATCAAAAAGG	CAAAACCCGA	CAAGGTGACA	480
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GTGAAAATAC	TGCCGAGAAAT	CGTGAACGGC	GTCATAGCCA	CCATCCCAGC	CTTAATGGCA	720
CTCAGATGAC	GCTGATTATC	CACTTTATGG	GCGATGGGCA	TGAAGAAGCG	GTTTCATAAAA	780
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GGCATGCTTC	TTTTGATATT	TTGCGTGAGT	CACCAGCGCC	AGTTTCATCA	CCGTGGCACC	900
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GATTTCCCCA	ATATAGCCAG	TCTTATGCCC	AATCTGGGGA	CCGACCAAAA	CAATGTCATA	1020
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GCTTTCGCGG	GCGTTTGCGA	TGAGCTGCAT	AATTTTCGAGT	TCTTGAGTAG	TTGCCATAGG	1560
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AATATGATCA	ATAACCCAGT	TTCCCAGTAA	GCCTATGGGC	CAAAAAGTAA	TTGATGAAAC	4320
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CCTGAGATGA	CAACAAATTT	CGACGCTATC	CTTGCTGACC	CCAACATTGA	TGTTGTCGTT	1020
GAGGCTATTG	GCGGCTTGCA	TCCTGCTTAT	GATTATATCC	TACGTGCACT	GCAGCACGGT	1080
AAACATGTGG	TGACCGCCAA	TAAAGCTGTC	GTTGCGCAAC	ACCTGCCTGA	ATTCATCACA	1140
ACGGCGGCTC	AGCATCACGT	TCGCTTTTAT	TTTGAAGCAA	CTACTGGTGG	TGGCATTCCC	1200
TGGATTTCGA	ATTTGGAACG	CGCTGCTCGC	ATTGACCAAA	TCGATACCAT	CGAAGGCATC	1260
TTTAATGGTA	CGAGTAATTA	TATTTTGGAT	CAAAATGCAG	GGGCGCATCT	CGATTTTGAC	1320
CCGGTTTTGT	TGGCAGCTAA	AGACATGGGC	TATGCCGAAG	CCGATCCCAG	TGCGGATATT	1380
GATGGTGACG	ATGTGGTTAA	CAAGCTGAAA	ATTTCCGCCG	CACTGGCTTA	CGATATGATC	1440
CCGCCGCGTG	ATGTTCCCTAA	ATTTGGCATT	CGTAATGTCA	CCAAAGCCGA	TATTGACTTT	1500
TTCGCCAGTC	GTCACCAGGT	TTTACGTCTA	ATTGGCAAGA	GCAGACGAGT	TGGTAACCAT	1560
TATAGTATGG	TCGTTGAACC	GCGTCTTTAT	CCGGCGACTG	CTTTGGCGGC	CAACACGTTT	1620
GAAAACCTCA	ACCTGATCCG	ACTGCACGGC	CAGACCATTG	GCGATTTGCA	GTTTTATGGT	1680
CAAGGCGCCG	GTAATATATC	GACTGCTAAT	GCCATTGTTT	AGGATCTATT	CGACATTCTG	1740
GAAAATGCCC	CGCATCTGAC	GCGGCACTTT	GATCAGAACT	TACAATTCTG	TGCAGATCTG	1800
AATACTGCTG	ATTACTTGCT	GCGCGCCGAT	CCGCTCACGT	TTGCCATGTT	TAACGATAAG	1860
GACACCGAAG	TCGTTCTGGA	TCATCTTTTA	ATCAAACAAA	TCCCGACTGG	TGAAATGCAT	1920
CGGCTCATGC	GTGGGGTTTT	GGCAATTGAT	GCTCATGCCT	TCATGGCAGC	CATTGGCGAT	1980
AGTGAACTGA	CCACCCGTAA	CGTCAAAGAA	CAAGTTGATC	AGGGGGTAAT	CGAATGAAAG	2040
TCGTTAAATT	CGGCGGCAGT	TCGGTTGCCG	ACGCCGGGCA	GTTTCAAAAA	GTCAAAGCCA	2100
TTATCAACCA	AGACCCGCAG	CGCCAAATCG	TTGTTCATCAG	TGCAGCCGGT	AAATATGGCG	2160
ATGCAACCCG	CAAGTTGACC	GATACCCCTT	ATCTGATTGC	GGATGGACTC	GAAGCCGGTC	2220

GTGATGTTAC	CCCCGCTTTTT	GCTCAAGTGA	CCGCCCCGACT	GGAAGCGATC	AATCAGGCTC	2280
TACATTGCA	TGTGCCACTC	ATAAACTCA	TGAATACGAT	TCGTCATCAC	ATCGCCACTC	2340
ATTACTCGCG	CGATTATTCT	GGTTTCGCGT	GGTGAGTTTT	TAACCGGCCC	CAACTGATGG	2400
CTGCCATTT	GGGCTATACC	CTTCGTTGAT	GCTGCTGATC	TCCTCTTTTT	TGATCAAAAT	2460
GGGACCATTG	ATGAAGCCAA	AACATTAGCG	GCTTATCGGC	GGTTACCGCG	TCATCACGGG	2520
ATAGTCGTT	CCGGATTCTA	TGGGCAAAAT	GCTGCCGGTC	ACGTACAAC	CATGGCGCGC	2580
GGCGGGTCTG	ACATTTCCGG	TGCGTGTTG	GCGCGGCTGA	CCCAAGCTGA	TCTTTACGAA	2640
AATTGGACCG	ATGTTTCCGG	AATCAAAATG	GCCGATCCGC	GAATTATTCA	AGATGCCGAT	2700
AGTATTGACG	TAATGAGTTA	TGATGAATTG	CGCGAATTGA	CCTACATGGG	CTTCAGTGTT	2760
TTTCAGGAAG	AGGCGGTCCA	GCCAGTGCGA	GAAAGTGGA	TTCCAACCTG	CATTCTTAAT	2820
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ATGCGGATCA	TTACCGGGAT	TGCCGGTCGC	AAGCATTATC	TGGTGGTGAC	GATTCGGCAA	2940
TATCAACTGG	CATTACATCT	CGATATCATT	CAGCATGCAC	TGGACGTCAT	TGCTGATCAT	3000
CATCTGGTCG	TTGATTATCT	CCCCACCGGC	ATTGACAGTT	TTAGTCTGTT	AATTCGCGAA	3060
CCACGCCATC	AGGTTTCCGT	TCACGAACTC	ACGGCAGCAA	TTAAAGCAGC	GTGTCAGCCT	3120
GATAAACTCG	AGGTCACCGA	GAATGTTGCG	CTCATTGCGA	TGGTTTCCCG	AAAGTTACGG	3180
CAACGACCGG	CAATTGCCGG	TAAGGTCCCTC	GCCTATCTAG	ACGACAACCT	GCTCAATGTC	3240
CAGCTTGTC	GCCAGACCAA	TGACGACATC	AATTTGTTAA	TTGGCGTAAA	TGATAAAGAC	3300
TACGACAAAG	CCATCCGCGT	GATTTATAGT	AGTATTCATC	AAAATTTTCA	CCGCCCCGGC	3360
CCATACATTG	AAGGCATTGC	TTAGTGATATC	CCGCCGCGTA	TTAATTTCTT	TAGACATCAA	3420
CCAAAAAGTG	GCTCCGTTGC	GATTTTAGAA	CAATCGCAAA	CGGAGCCACT	TTTTTAATTA	3480
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GTACTTGATG	CCGCTTGCTC	GGTAGTGGCC	GGTTGATCAC	TCTTTGGCGC	CGGTGCTGGT	3600
TGCTTGGTGT	CAGGCGCTTT	GGCTGCTGGT	TGCTCGTGGT	GCTTGATCGC	ATCGACAACC	3660
GGTTGATTGC	CAGCCTGATG	CATCAGTGCG	CCATTTAACA	TCCCGCGAAT	ATCGATGCCG	3720
GCAACTTCTT	GCAGCATGTC	CAGTTGCTTG	ACCAAACATGC	CGCTGGTTTG	ATTCGTGAGG	3780
TCGCCATCTCG	CATAAAGCTT	AATCGAGTCA	ACATTTGCAT	ACGGACTCAT	AGCAGCCTCA	3840
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CGTTCGATTT	CCTGCTGCTT	TGCTTCCTGA	TCTGCTTGCG	CCTGTTGAAT	CCGGGTATCG	4380
CGATTGGCGG	CTGCTTCGGC	TACAGCGGCG	TTCTTTTTTAA	CTTCCGCAAT	TTGCTTCTTA	4440
CCCAGTGAGT	CCAGATAACC	GTTCTTGTCG	GCAATATCTT	TGATCGTGAA	CGAAATAATC	4500
TGTAAACCCA	TTTTGGCTAA	ATCGGAACTC	GCCACATCCT	GGACCTTTTC	GGCAAAGGCA	4560
TCACGATTCT	GATAGGTATC	CTCAACCGTT	AATGTGCCCA	AAATTGCCCG	TAAATGGCCT	4620
TCCAGAATTT	CGGTGGCTTC	CGAATTAATC	TGCTCGTCAT	TTTTGCCTAA	AAATTGTTCC	4680
GCAGCGGTTG	CGACTTCTTC	CTGACTGGAG	CCGATTTTAA	AAATAACCGT	CCCGTTGACA	4740
ATAATCGGAA	CCCCTTGTTG	CGTGTAGACT	TCAGGCGTTG	CGACTTCAAT	GGTCCGCGTA	4800
TTCAGACTTA	AAACGTCCCA	GCGCTGTAAA	ATCGGTAAAA	TAAAAGATCC	GCCGTTGGTA	4860
ATCAACTTGA	CACGATTGCC	ATTGACATCG	CGAAAACGTG	GCTTGCCGGA	AATTAGAGCA	4920
CCGAAAATAA	TCAAGACTTC	GTTAGGCAAA	GCGGTCTTAC	GATGGGTGGC	CAGGAAAATA	4980
AAGAGCAAGA	TCAATAAAAC	GGCCGCGATA	ATCCACGGCA	TATAATCAGT	TAAAATTTCC	5040
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GAGTTCAATG	ATCACGACTT	TTGTGCCCTG	ATTTAGCGGC	TGGCTTTTAT	CCGACCACAG	5160
CTTGGCCGGA	TATGTCTGGC	GGGCCCCGACC	ACCACCGGTT	ACCATGACTT	CGCCAGTGTA	5220
ATGATGCGCC	ACATCTAACG	TCAGCGTACC	GAGTAAGTAA	TCCCGATCGC	TCATTGATGT	5280
GGTGTCTCTA	ACCGGCGACA	GTAGCCGTTG	CAATACGCTA	AATACGGGTA	ACAGCACCAG	5340
CGATACAACN	ATCCATAAGA	GACCGCCAAT	GATCAATAGC	GCCACCACCC	CGACGATCAC	5400
CTGTAACCAC	AGTTCTTGCT	GTGCCCCACCA	TGCCAACACG	ACACTCGCCT	CGCTTTCAAA	5460
GGGACTAAAA	TCTTCCTCAT	TTTATCATGT	AAACGGTTAT	ACGCAAATAC	CAATAAGAAA	5520
AATATTTAGT	GTTGCTTTGC	ATATTAACTG	CGAAGCCAAC	AACCCGTCTC	TATGTAGTTT	5580
CGGTGGCATG	AAGAAGCTAC	TCTTTGTTTG	CCACCGACTA	AAGCTTCAAA	AATCACGTAT	5640

ATTGCGTGAA	TGCTTTTCGA	CCTCCCATT	GTGTAATGC	AAGGCATAGT	CTTCCGATAC	5700
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<211> 1330

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 36

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TGTTGATGAA	AAAGGTGCTG	ATTTTAAAAT	TCGGGACGAT	GTTGAACTAG	CGCCGATGGG	180
TCCTGACGAC	CTTCAAGTCC	ATATGGTCGC	CAGTGGTATT	TGCCATTCCG	ACGAAGCCTT	240
ACGTATCGGG	GATGCCGTTA	TCGGCTACCC	GATCGTACTA	GGCCATGAAG	GTTCAGGGAT	300
TGTTGAAAAA	GTCGGCCCCG	AAGTCACCCA	GTTCAAACCT	GGCGATCACG	TTGTTTTAAG	360
CTTTTATGCC	TGTGGCAACT	GCAAGAACTG	CTTGAAGGGT	ATTCCGACCC	AGTGTCTTAA	420
TTACGCCCCA	AACAATTTGT	CCGGTACCCG	GCCAGATGGC	TCCGCGCACT	TCAGTAAAAA	480
TGGCAAGCCG	GTCGCAGACA	TGTTTCGACCA	AAGTCTCTTC	ACAACTACCA	CGGTCGTTTCG	540
TGAACGTAAT	GCGGTTAAAG	TTGACAAAGA	TCTTGATTTG	CGCAAGCTTG	GACCGCTTGG	600
CTGCGGCTAT	GTCACAGGTT	CCGGAACCGT	TTTGAATACG	CTCAAGCCAA	AGCCTGGTGA	660
TACGATTGCG	GTTACCGGTA	CTGGCGCCGT	TGGATTAGCC	GCAATGATGG	CGGGCAAGAT	720
CTCCGGATGC	ACCAAAGTGA	TTGCGATTGA	CATTGTGGAT	TCCCGACTCG	AATTAGCCAA	780
AGAACTCGGC	GCAACCGATG	TCGTTAATAG	CAAAACCGAA	GACCCGGTTG	CCGCAGTTAA	840
AAAATTGACT	GGTGGCCTCG	GGGTGACTG	GGCTGTGCAC	ACAACCGGCG	TCAAGGCAGT	900
GATGGAAGAT	ACGATCCAGA	TGCTGGCTCA	GGGTGGTACC	ACCGCAACGA	TCGCGGTTAC	960
GCCACATCAT	ATTGACGTTG	ATACCTGGAA	CGACCTCTGC	GTCAATGACA	AGAAGATCGT	1020
CGGCGTCAAC	ATGGGCGATT	CCATCCCACA	AATTGACGTA	CCGCGCCTAA	TTGAGTTCTA	1080
TAAGCAAGGT	ATGTTGACT	TTGATAAAAC	CGAAAAATTC	TATCAATTCTG	ACCAGATCAA	1140
CGAAGCCAAT	GCTGACTCCC	GCTCTGGCAA	GACCATTAAA	CCGGTTTTGA	TTATTGATAA	1200
AGACTATGTA	CCGGGTAAAGT	AATTGATCTT	TTCCCTTGGC	CCTAGCTGTG	GTTTGAATTC	1260
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<211> 1605

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 37

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CGTCATTGTC	GGTGATTATG	CGCAGTTTTC	CAAAAAGCGC	GATGATGTGG	TTAAAGCTGC	180
TATTTTTGGC	GTTATTCTTG	CTGGTGTCTT	GATGATTGCG	GTTGGCGCGA	TTTTGACGAT	240
TGCGTTTAAAG	TCGACGGATA	TTAGTAGTTT	GTTTATGAAA	ATCGGTTTCG	CGGTTATCGG	300
TGGTCTGGCG	CTTATTCTCG	GCACGTGGAA	AGTGAACGTT	GTGAATGCCT	ATTCTGGCGG	360
GATTGCAGTG	GCAAAATTTT	TCAACATCCC	GGAGAAATAT	CGCAAGTTGA	CGCTGTTCTT	420
GGTGGGCGTC	GGCGGCACGA	TTTTGTGCGT	TCTGGGGATT	TTAAATTATT	TTGAGCCGGT	480
CATGACGATC	TTTTCAGCGA	TGATTCCACC	GGTTGCCGGA	GCGATGGCTG	CGTCTTATTG	540
GGTGATTTCAT	CGTGTTGAGA	TGCATAGCTG	GCAGCCGGTC	GCCGGAGTGA	ACTGGCTTGG	600
CTTGACCGCG	TGGGCGCTGG	GTGCGGTGAT	CGGCGTGCTG	CCCCTGCGGT	GGCCGGCGAT	660
CCCAAACATT	CCGGTGCTCG	GGATTATTCT	TGCGTTTGTC	CTGTATTATG	CAGGCGCAAA	720
GATTTCATCCA	GAATGGGACA	AAGCATCAGA	GTTGAACTAG	CAGGCAACA	TTGACCAAGG	780
TGATCCCAAA	AGAATCCACT	TTCGGTTGTT	TAGCCAGTG	TTGGTGCGCG	ACTCGTATGA	840
CTTAGCGGAC	TGAAGATAAG	TTTAAAAGGA	GAACAATATG	CGACTTTTAG	ATCAGGAATC	900

CATTGAAAAT ATAGCGACCG GCGCGGCTTT TTTCGGTGCT GGCGGTGGCG GTAATCCGTT	960
CTTGGGTAAA TTGATGGCCC TTGATGCGAT TAAAAAGCAC GGACCGGTGA AGTTGCTTGA	1020
TGTTTCAGAA ATTAACGATG ATGATTATTT TTGCCCAGCA GCGATTATGG GTGCGCCCGC	1080
GGTCATGATG GAGAAGATTC CTAAGGGTGA TGAGTTTGAA CGGGTTTTTA AAATGTTAAG	1140
CCAGTATACC GGTTCATGAGT TTGTAGGAAC TTTTCCCATG GAGGCCGGCG GGGTGAATTC	1200
GATGGTGCCG ATTGCGCTGG CCGCATCGCT AGGAATTCCA CTAGTGGATT GCGATGGGAT	1260
GGGCCGCGCG TTTCCGGAGT TGCAGATGGT GACGTTTTAC TTAGGCCGGCG TGGCAGCAAC	1320
GCCGATGGTC ATTACGGATG AAAAAGGTAA TGCCGGCGTG ATTAAAACGA TCAGTGCCAA	1380
GTGGGCTGAG CGATTGGCCC GTGTACAAAC TGTGGAAATG GGTGGTAGCG CAACAGTAGC	1440
GTGTATCCTT TCGAACGGCA AGCAGATTAA GCAAAATGGT ATTCGCGGCA TTGTCACCTT	1500
GTGCGAACAA GTAGGCTTGC GAATTTCGCGA TGCCCATTAT TTAAGACTGC AGGAATTCGA	1560
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<210> 38

<211> 477

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 38

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ACTCCTTCCA TTGTCAGCAC GGCCGTCAAC GGATTGCTGA CTGACGTAA GGAGACCAAG	180
GACGCTTACG AAGTTCATGT TGATGTTCTT GGGATCGATA AGAACAACAT CAAGTTGAAC	240
TACCATGATG GCATTTTGAG CATCAATGTT CACAAGGATG ACATCACAGA TCACGCCGAC	300
AAGAACGGCA ACGTCATGAT GTCCGAACGC AGCTATGGCA CGATGAGTCG GAGCTATCAA	360
CTGCCAAACG TTGATGACAG CAACATCAAG GCAAACTACA AAGATGGTGT TCTCAACATC	420
ACATGCCCAA AGTTGACTGA ATCAAAGGAG TCTGGTCACA ACATTGAAAT TCAGTAA	477

<210> 39

<211> 15054

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<220>

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<222> (1) ... (15054)

<223> N = A, T, C OR G

<400> 39

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ATTAAACCAA CCCAGCCATA CCACCCGAAT CAATTGTTTT CCCGCACATT CCACACAAGT	180
CCGATATGCC AATTTCTGCT TTAGGACAAT CAGCTTTCGT ATCATGACCG AACTTTACAG	240
AAATAAATTA TATGCATATG CTCATTAATC GTCGTTTCCC GATCTGGTAG CTGCTGAAAA	300
CCGACTTTGC GATACAAATG TACCAACTTG GGTTCCTCCG CAATCGTGTC TACATACCAT	360
GTTTGAATGA GCGGAAACTG TTCTTCAATC AACTGTAGTC CGAGCTGAGC GTATCCCTTT	420
CCTTGATAAA ACGGCAAGAT TAAAAATGGT GAAATACGGG CTGCCGAATT TTTGAGATCT	480
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TTAGGCCGTT TGAACTTTTT CTGTAAGCTT TTCAACGATT CACAGTAGGG ATTGGTTTCC	600
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TTGAGATCAG TGTAATAATAC TGGCGAAAGG ATTAGTTTCG CTTTTGACAT TGCTGTTGCC	720
TTCTTTTGGG ATTTGCATAG CATTTATGAG GTGAGTCTTC ACTGAAGGTT TTTGATCTGA	780
CATCTACCTG AGACTGCCGC GTCGATCTTT GTCAATACCC GAGTGTTCTT GAAGTATTG	840
ATCTGACATC TACCTGAGAC CAAGCGGTGG GCAAACTCAC TTCGTCATCA GTTCTTGAAC	900
TGATTGATCT GACATCTACC TGAGACCAAC GGCCAGCGAC AGCGCAACGC GTCAACGTTT	960
TTGAACTGAT TGATCTGACA TCTACCTGAG ACTGGCGCAA CGGAACAAGG GGCAAAATAT	1020

TGGTTCCTGA	ACTGATTGAT	CTGACATCTA	CCTGAGACTG	CGCGTCGTTT	TGATTTTGAA	1080
GATGCCGCGT	TCTTGAAGTG	ATTGATCTGA	CATCTACCTG	AGACAACGGT	AAGCCACACA	1140
AGCGACTAAC	ACGCGTTCTT	GAAGTGATTG	ATCTGACATC	TACCTGAGAC	CTCGGCGCCG	1200
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TGCAAAGGTT	TCGCCAACTG	CGTCATGTTT	TTGAACTGAT	TGATCTGACA	TCTACCTGAG	1320
ACGGCAGCAA	TTGCCGGCTG	TTGTTGATGT	TGGTTCCTGA	ACTGATTGAT	CTGACATCTA	1380
CCTGAGACGT	AAATCGTGCC	GGTATTTACT	TGGCTATTGT	TCTTGAAGTG	ATTGATCTGA	1440
CATCTACCTG	AGACATTACC	ACGCGTTCCG	ATGGTAAAC	ATTCGTTCTT	GAAGTGATTG	1500
ATCTGACATC	TACCTGAGAC	ACATACATTT	CTTTTACGTC	ATCGTGTTCA	GTTCTTGAAC	1560
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TTGAACTGAT	TGATCTGACA	TCTACTTGAG	ACGGCGACAC	TGGAGCGCTT	TCGGTTGCTA	1680
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AGCCCATCAT	AAAAGTTCTT	GAAGTGATTG	ATCTGACATC	TACCTGAGAC	TGCAACGCGC	1860
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ATTAGTTCTT	GAAGTGATTG	ATCTGACATC	TACCTGAGAC	TTCTGGAAGG	ATTGTCCCAA	3060
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GAACCAGATC	AAGCAAAACT	TTGGGTAACC	CTGTGTCTAT	TACTGTTATG	ACGGAGGGCT	3900
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CATCAAAAAG	CCTTCATCAA	TGAGTGCTCG	CCGAAACCTT	CGATAATTTT	GACGATCTTT	4200
TGAAGTTGCA	ACCGGTAAT	CAAACATGAT	CATTAATCGC	ATGGCTCGAT	ACCTCATCTG	4260
GAACTTCAC	CTCAATTCGA	CACACCTTAG	CTTTGCCATC	TAAAAAGGCC	AGACAATTTT	4320
CAACATGATC	AGCCACTGCA	TTTTGGAGTA	AGGCTTTCTT	ACCGTTGAAC	GTAATCTCTA	4380

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TGCGAAATGG	AGGCTCATGA	TGACAGTAGC	AATTTATGGA	CATCGCGGTT	ATCCGGCGCG	4440
TTTTCCGGAG	AATAGTTTGC	AAGGATTTCG	ATATGCCTGT	GAGCATGGCA	TCGATGGCAT	4500
TGAAACCGAT	GTGCAGATGA	GTGCGGATGG	GCATCTGGTG	ATCATGCATG	ATGAACGGGT	4560
TGATCGTACA	ACCGATGGCA	CTGGCTGGAT	TGCGGATTTA	ACCCGGACGC	AACTAAAAGG	4620
GATGCGGCTG	GCCAAATGGC	AACACATTCC	ATCGCTTCGG	GAAGCATTGA	CGGTTTTAAG	4680
CCATTATGAC	GTGATGGTTA	ACATTGAGTT	TAAAACCGGC	AAGATCCGCT	ATCCGGGCAT	4740
TGAGGCGCTG	ACGCAAGATT	ACGTTGAGCA	GTTCAATATG	CAGGATCGCG	TCATCTACTC	4800
CTCATTTCAAT	CACGACAGTA	TTAACGTCAT	TCATACCCTT	GCGCCGAAAA	TGAAAACGGC	4860
TTGGTTAACG	AGTCGGGTTT	TAACCGGCGC	CACCTTACCA	TCGTATTTGG	AAGCCGTCCA	4920
CATTGAACAT	TACAACAGCC	ACCTCAACAA	AGCCCAGCGC	GTCTGGACAG	TTGATGATCC	4980

GCTGAAAATG	AAACAACCTGA	TGCGCGAACG	TTACGTCACC	GGGATCATT	CCAATCGTTT	5040
TGAAGAAGCA	ATGGATATGC	GCGACTTGGT	GGCCAAAGAA	GCTAAGGCGC	CGGTTTAAAA	5100
TGCAGCTCAA	GGCGATGTTT	AATTACAGAA	ATTAAAAAAC	TGCTTTGGAA	GCAATCTTGC	5160
TTTCGAAGCA	GTTTTTGATT	TTTATACTCA	AAATAAGAAA	CGCCTAAAAA	CACGCGCCCT	5220
GATCAATTTT	GATGATGTTT	ATCAATCAAT	TTCTGTTGTA	ACGCTGCCAA	TTTCGGCGTG	5280
AGGTAAACCG	GATAGAGATC	CGGATTAACG	AGCCGTTGCG	TTGCTTCTGG	TAAGTGTCCG	5340
AGTGCTGTTT	GCATATGTTT	TTGAATGGCA	AAGACATCGG	TCGTGAGCGG	CTCTTGTGCT	5400
TGAGGGAAGA	CCGGTTTTAA	TAACGGTTTC	GCAGTGAAT	CGCGTAAGGT	GACTTGCGTT	5460
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AACGCAATGA	CATCCGCAAA	AGCCGTTTGA	TCATCACAGT	GATACAGGCG	ATAAACCTGT	5580
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TTGCCGTTTG	CTTGCAATGC	GGTCATTTTG	TAAACACCGC	TTAAACCCGG	AGATGAGGCG	5700
CTGGTGATTA	ACTTTTCACC	GATTCCAAAG	TTGTCAATCG	GTGCGCCTTC	TTTAAGTAGG	5760
GACTGAATGA	CGGTTTCATC	AAGCGCATTG	GAAGCTGTGA	TTTTGGCATC	CGGGGAAGCC	5820
GGCGTCATCG	AGCATTTTCC	GGGCTTGTTT	CGCTAGCTGG	GTGATGTCGC	CAGAGTCGAT	5880
GCGGATACCA	ACGGGGTGAT	GGCCGGCTGC	CCTTGAGTTC	CTTAAAAACG	GTGATCGCAT	5940
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AGACTTTAGC	CCAGGCACGA	AAAGCGGTGA	GTTTCATCGG	GAAGGCTTCG	ATCCAGCTGT	6060
GGGCCATTGT	TCCCGGCAGC	CGGGATGTTG	AAGCGTTGTG	CAGCCAAGAC	GTTGGAGGTG	6120
CTGGCACAGC	CGCCAATCAC	AGCAGCACGC	GCTCCATAAA	CCGAGGCATC	CGGTCCTTGC	6180
GCGCGGCGGG	CACCAAAATC	CATAACCGGC	CGTCCTTCAG	CCGCAGCCGT	GATGCGCCGG	6240
GCTTTGGTTG	CAATGAGTGA	CTGGTGATTG	ACGATGTTGA	GCAGCAGCGT	TTCCAGCAAC	6300
TGGACCTGCA	TCAGCGGCC	TTGCACCGTT	AACAGCGGCT	CACGCGGAAA	GACGGGTGTG	6360
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GTATCCGAAT	AAAGTTTCAA	CGAACGCAAA	TATTTGATAT	CTGCATCCTC	GAAGTGAAAG	6480
TCGCGTAACG	CTTCAACAAC	TTGTTGTAAC	CCAGCGGCAA	TAACAAAAC	GCCATGATCC	6540
GGGACATTGC	GATAGAAAAT	ATCGAAAACG	GCCTGGTCTT	CATGCGGTAA	GGTCGCACAA	6600
TACCCATTGG	CCATGGAAAA	TTCATAGAGA	TCCGTCAACA	TTGCTTGATT	CATATTCATC	6660
TTTAAAAGCC	TTCTTTATCA	GTCCGTGGTT	AATTAATCCG	TTACTTCGGC	GCCCAAAACA	6720
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TTATGGACGA	CAATTTGATA	GTTGAGATTG	TAAGCATCAA	CTGCCGTATG	CAAAACGCAG	6840
ATATCGGTGC	AGACGCCGAC	TAAATGAACG	GTGTGCATTT	TGCGTTCACG	TAGGCGCAGA	6900
TCCAGCGGCG	TTCCGGCAAA	CGCGGAGTAG	CGGGTTTTAT	CAAACATGTT	CACCCGTTCT	6960
TCATCTTTAT	GGGCCGCATA	CCAAGGCGCA	AGCGAACCAA	AGAACGCCCG	CCCCCAAGTC	7020
CCGCGAACAT	TATGCGGCGG	GAACAGTTTG	CTTTCGGGAT	GATACGGATC	GTGCGGTGTA	7080
TGCACATCGG	TTGGCAAGTA	TACCCAGCCA	TCTTGTTGCA	AAAATTCATC	AGCCAAAGCG	7140
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ACAAAGTCAT	TAGTATAGTC	AATAATGAGC	AATGCTTCAT	TTGAATGAGC	CATTATTGAG	7260
GCTTTCCTTC	TAATTTAAAGT	AAAATTTACT	TTAAACTCAC	GTAGTATAAA	AGTACATTAG	7320
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TAAAACAATT	TAGGTGGGAC	ATGCCCTTGG	GCCGGGCGAT	CATTGGGCGA	GTGCCGATTT	7440
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<211> 1449

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 44

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GGGGGCTCCA	GAAATTCAGG	CCACGTGTCT	TGTTTAATAG	AGAAACCAAA	GTGGGCGACT	180
AACGCAGAAA	ACTGCGTTGG	TCGCCCCTA	TTTTTGTTTG	AACCCAGGGA	TCTGAGATAC	240
CATCAATGGT	TAAGATTCAA	CCCGGTTCCG	TGTGGAGTGC	TTACGATCAT	TCAATCATGA	300
TCAAATAGTG	AATCTACTTA	TAACACTCA	ACCTCAGCTT	AGCAATAACG	GCACTAGTCC	360

AATTAACATC	ATACCCATTG	ATGATCCATC	ACCTGTTTGA	GGTAATCTAC	TTGTTTTATC	420
GTACATTTTA	CCTTGAGTGA	AATCCTTTGG	TGTTACCTTA	TTCCCATAT	TAGGAACTTG	480
AGGTTCCCTTA	GGCGTTGTCG	GGTTATTAGG	AACCTGGGGC	TTCTTAGGCG	TTGTCGGATT	540
ATGGGTATTA	GTAATATTGT	AACCATCAAC	AGTACTGGTG	TACCCCGCAA	CTGCATCTTC	600
CGTAACTGTG	TAGGTAATCT	TCTGACCATT	AGCATAAGCA	GCTAAGTTGT	CGAAACTGTA	660
CTGCCAGTTA	TCACTGGCAG	TAACTTTCTT	GCTTGCAACT	TGTTGACCAT	TGGCCAATGA	720
GTTTACCGTG	ATTGAACCTG	GACGGATTCC	ATCTTGATTG	TTGTTATCCC	TCCAAGTCTT	780
CGTCCCTGAA	ACTGAGGTTT	TCTCAATCTT	ATCGATAATT	TTAATAACGG	CCCCTTTTTA	840
ATCAAAATTT	GTAGAAGTTA	CGATTACCGT	ATCTGCTAAT	TGATATCCCT	TAGAAGCTGT	900
CTAAAATCTC	TTAAGAAGCT	GTTTAGTATC	TTTGATTTTG	ACCCAATAAT	TTGATAAACT	960
ACTGTCAAAA	AAGTTGGTGA	TCATATGCAA	CATTTTAGTC	ATCATTACCA	AAGCGATATT	1020
TCTCGGCAAC	AATTGGATTT	GATCCGTCAG	GATCTGGAAG	CTTCAAGAAA	ACGAACTCAC	1080
CCAAAACACA	TTGATCCTTA	TGATATCTTC	TGTGCCATGC	TCTATGTCCT	TAAAAATGGC	1140
TGTAATTGGC	GTGATTTGCC	GGCTGATTAT	CCAAAGTGGT	CCACCGTTTA	CTACTATTGG	1200
ATGAGTTGGT	CAAAAGCCCC	CACCCCTGAT	AAACCAGCTT	TATTAACTCA	GGTTTTAAAA	1260
AAATGTGCG	TGATCGACGA	TTAAGGCAAG	GGCGGTCAGC	CCGAACTTCG	TTCGTCATTT	1320
TAGATGCCCA	AAGCATTAA	AACACCGCTA	CCGCTGAAAA	TAAGGGTTAC	GATGGTGGCA	1380
AGAAAATTC	CGGCATTAA	CGCCATTTAG	CCGTTGACAT	CAATGGATT	CCCCAAGCTA	1440
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1449

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<211> 3549

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 45

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CGCCGTTTCA	TCAGGGAAAA	GCCGCTGGGT	GTCCAGCCAG	GCTAGAAAAC	CGGAATCGGA	180
AGGCATCACC	TGAATTTCCG	GTATGACTTG	CAAACGGTTG	ACCAAGTAGG	CAAAGTTAGC	240
GGCGACATAA	GCCACCATTT	CATCCAGCCA	CGCATCACAA	TCCGTATAAG	CAGCGATGAG	300
GGCTGGCACG	GCAAAGCTAT	TAGGTGAGGT	AATCGAATTG	GCGACGAATT	GAGCGTTGAG	360
TCGGGCGCGG	ATCGCTGGGT	CAGGGATGAC	GACATAGGAC	GTTTTTCAGAC	CGCCTAAATT	420
GAAAGCTTTA	TTGGGTGATA	AACAAAGAAT	ACTTTGGGAT	TGAATAGCTG	GGCAGGCTTG	480
CCAGATGCTG	GTAAATGTGA	CGCCGGGATA	AACAATGTCC	CGGTGAATTT	CGTCACTAAT	540
GAGTAAACC	TGATGCTGGC	GGCAAAGTTC	ACCCACGCGT	GCTAGTTCTT	CAGCTGTCCA	600
GACGCGGCGG	GACGGATTTT	GCGGACTGCA	GAGAATGAAC	ATCTTAACGT	CCGGCCGTTG	660
CATTTTAGCG	GCCATGTCTG	CAAAGTCGAA	TTCGTAGCGA	TTGTCCACAA	GCATGAGCGG	720
ACTGGTGGCG	AGCTGACGGT	GGTTATTGCG	CACGGCTTCA	GCAAACGGAT	CATAGGCCGG	780
CGTGTTGATT	AACACCGCTT	CATTTTGTTC	GGTGAATGCC	TGAACCAAGT	AGTGGAGGGT	840
CGGCACGGTG	CCATAGCTGA	GTTTGATCCA	GTCTTTTTTC	AGTTGCAACC	CGAAGCGGCG	900
CGCGTTCCAT	GCGATGACTG	TCTCATAAAA	GGCTTCGGGG	ATGTAAGTGT	AACTGTAGTC	960
AGGTACGGCC	GCGCGTGTCA	TAATGGCTTG	GTGAAATCGC	CGGGGCAACC	GGGAAGTCAA	1020
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GATCCGCCCC	CTTTCGCGCT	TTGGCGGGCT	TTGCGATCAA	AAAGGCGATT	AAATTGGCTC	1140
ATGTTCAAAGC	ACCTCCAATT	GATTCATCTG	CCGAGATGTT	TGGTTTAAAC	CGCGCGCGCC	1200
GGTTTCGGTG	ATGACAACAT	CATCTTCAAT	GCGGACGCCG	CCAATGCCGG	GAAGATAGGC	1260
GCCCCGTTTCG	ATTGTGACAA	TCATACCCGG	CGCTAAAACG	GTTTGACTGC	GGGGGTTGAG	1320
AATTGGCTGA	TCGCCGCCTA	GTCCCAAGCC	GTGCCCTAAA	CCATGCGTGA	AACAGTCACC	1380
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AGGCTTCAAA	GCAGCAATTG	CCGTTTGTG	GGCGTCCAGA	ACCGCCGCAT	GGACTGCGGC	1500
AAGTTCTGCG	GGTGGCTTGC	CGATGCTGAG	TGTCCGCGTC	ATATCGGACT	GATAATCAGC	1560
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TGCCGGGGCG	AATATGCGGG	AGGAGTTGGG	TAAAAATTTT	GTCAGTCATC	GCACAGGCCG	1800
CCGCAACTGC	CGCAATTTCC	GCTTCGTCCT	TGCGCATGCG	TTGTTCCATG	ATCAAGTCAT	1860

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GTAAGTAAGA	TCCCTGAGGC	ACTTCGATAT	TTGTAAATCC	CTGGGTATCT	GCGGCCCTCTG	2040
CACGATAGCG	GCCATCGTGG	ATTTGCACGG	CCTGCGTTGG	GGTCACCACG	ACATACACAC	2100
CGCTGCCGGG	CAACGCGCCG	ACATAGCGTT	TACTTTGGCG	ATCATGCAGC	AGCAACGCGT	2160
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TGAGCATTTT	TTCAGTAACC	ACAGCATGCG	GCCTGATTAG	AAGTCGAGAT	CCAAGCCAGC	2340
CAAGGTATCC	TCGTCTTCTT	TTGAAAAGAT	TGATTTCTGC	GATGCTTTCT	TGGCTTCATT	2400
CTTCAACTCG	GCACGTTCCA	TAACCTTGAA	GAATGGCCAG	TACAAAGCGA	CTGCTAGGAA	2460
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TAAGGAAATT	TTACCGATTT	TACGATACCG	CTTGCTCTTA	GACAGCATGC	AGGCGACCAC	2760
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CACCATAATC	GGACTGGTGA	TCGGCGAGAA	AACCGACGAG	TGAATTCCAA	AGAAGAAGAC	2940
AGTACAAATG	GCGAAGTTAA	GCGCCAAGAC	AGCCCACGGA	TTATCCATAC	TCCCAACCAA	3000
TGGCGCCAAG	AAGCGAGTCA	AGATGCTTGG	CGGCAGCTCA	CCAGCCAGAT	TCAAGAAGAT	3060
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ACGGGAAACA	AAATCCGGCA	CCCCATCCGG	CATCTTGATC	GTAAAGTGGT	GAGTTTTGCA	3180
CCAGTGATAT	AACTCAACCG	TCAGCAAGGC	AACAATCATG	CCGGTAAATA	AACCGCGAGC	3240
GCCAAGGTTG	GCGACATCCA	GTTGGCCGGT	TTTGTTAAAA	GTTGCGACCA	TCATCAAAAA	3300
GGCAAAACCC	GACAAGGTGA	CACATCCGGG	AATATAAAGC	TTGTAATGAT	TACCTAAGTT	3360
GTAAGCAATG	GATAAGCAGG	CATACAAGCC	GATCGGCGCC	GACAACACTT	CGCTAATGTC	3420
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<211> 4865

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 46

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CGCAAGGCCG	ATAAAGCCAA	GTACAAATCG	ATTGCCGACT	TTTCCGAAA	ACGAGTAGGG	180
GCACAAAAGC	AAACGACGCA	GGAACAGCTT	GCCAAGACCC	AAC TGCCCGG	TGCAAAAGTC	240
ACGAGCCTGG	ATAAAGCAAA	TGATGTGGTT	GCACAAATTT	CGTACAACAA	ATTGGACGCC	300
GGGGTTTTGG	CTAGTACCAT	TGCCGACTCC	TATGTTGCC	GGACACCGAG	TTTAACCGTG	360
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CCTGCCTTGT	TAAAACAAGT	CAACAAGACG	ATCAGCAAG	TTAAAGGCGC	CAAATACAAA	480
AGTTATCTGC	AAGCCGCCTA	CAAACTACAG	GATCAGGATC	AAGGCTTCTG	GGCTAAGTAC	540
GGTAACTACT	TTATCCGCGG	CGCTATTTAT	ACTTTGGTCT	TCGCGGTCTT	AACAGTCTTA	600
TTCGGAACTA	TCATCGGCAC	GCTGCTTGCC	TTGATGAAAC	TCAGTCGCAA	TTGGCTGGCT	660
AAAGTGGTGG	CTAACATCTA	CATCGAGTTT	ATTCGGGGTA	CGCCGTTGTT	GGTTCAAGCG	720
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GCGATCGCCA	TGGCTATCAA	CTCCGGCGCA	TACGTTGCTG	AAATCATTCG	TGGCGGGATC	840
AATTCCGTCC	CTGTCGGTCA	AACCGAGGCG	GCTCGGTCTT	TGGGTCTGCA	CCAAAGCCAG	900
GCAATGCGAT	ACGTCATTTT	GCCACAAGCA	ATGAAGAACA	TCTGGCCGGC	ATTAGGCAAT	960
GAGTTCGTCA	CCGATATTAA	GGAAAGCTCG	GTCTTGTCGG	TTATCGGTGC	CACCGAATTA	1020
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GTCGCCATTC	TTTACTTCAT	CATGACGTTT	ACCCTATCAC	GACTACTACG	CCTGATTGAA	1140
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GGAGGATATA	TTTTCATGAC	AGAAAAAATT	GTACTAGCCT	ACTCAGGTGG	TCTTGATACA	1260

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GTCGGTCAAC	CCGGGATGCG	GATTTTGTACG	CGAATTAACA	AAAAGCGCTT	AAAAGTCGGT	1380
GCCATTGATT	CGATTGTCTAT	TGACGCCCAA	AACGAGTTTCG	GCGATCACTA	TGTTGCGCCG	1440
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GCTTGCCCTGC	AAACCAAATT	GGAATCTCAC	GTTGCGCACT	GGCTTCACTA	TCTGAGCTGT	540

GAATAACGTT	GCGAATCGTC	TGATCGGCCC	ATTCCCGACC	AAAGTCCCCC	CGAATCGTGC	600
CTGGCGCAGC	ATCTCCGGGA	TTCGTAGCGC	CTGTATCATG	TCGAACGGCT	TCGATCACAT	660
TAAACCCGCT	GACAATCATC	GCCACCAGCG	GGCCACTGGT	CATGAAGCGT	TCAATTTTGG	720
GAAAGAACGG	CTTGTCACAA	AGTGCTGCAT	AATGCTGATG	TAATTGGGCG	GAGGTTGCCT	780
GTGTGACTTT	TAGTGCCTCA	ATGGTGAATC	CGCGTCGTTT	TATGCGGGTA	ATGACCTCGC	840
CGATATGTCC	TTGGGCGACA	CCATCGGGCT	TAACCAAGAC	TAAAGTTTGT	TCTTCTGCCA	900
TGCATGTGCC	TCGATTCCTT	GAATATTTTC	AGTAAATTCT	TTCATATTCA	GTATACACGA	960
GTGGTAGCTG	ATGAAAAAAG	GCAGTTTAGC	TTTAGTTAAG	TTTATTTTTC	CCGCAAAATG	1020
AACTGCTATT	ACCGGCAGTA	AGCATAGATG	TACCAATACT	TTTTTGGAAT	AATGCTGAAC	1080
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<211> 3705

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 50

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TGGCGATTCA	TTTGTACTTG	GCAGCGTATC	TTTAGTGGAC	GCTTGACTGC	TTGCCCCATT	180
ACTATTGGCG	TTTTCGGTCC	CTGTTGGTTG	TGCCGGCGTT	TCTTGCGTCT	GTTTCTTGTC	240
GTCCGCCGCC	TTTGGATTGG	TTGATGGTGT	GTCTTTTGGT	TGATTTTCCT	TGTCAGTGCC	300
AGAGCCTTTC	CCGGCATCAG	AACCGCTTCC	GCTACCAGAT	CCCTTACCAG	TATCAGAGCC	360
ACTTCCGCTG	CCAGACCCTT	TACCTGCTTC	GGAACCACTT	CCGCTGCCAG	ACCCTTTGCC	420
TGTGTCAAGG	CCACTTCCCG	TGCCAGACCC	TTTGCTGTG	TCAGAGCCAC	TTCCGCTGCC	480
AGACCCTTTA	CCTGCTTCGG	AACCACTTCC	AGTGCCGGAA	CCTTTACCTG	CTTCAGAGCC	540
GCTTCCGCTA	CCAGATCCCT	TACCACTATC	AGAACCGCTT	CCGGATCCGC	CTCCAGGTTG	600
CTGTGGTGTC	TTGGCAGCTG	CCTCAACCGC	TGCGGCAATT	TTAGTCTTCA	AACCAAACAG	660
ACCTTGCAAT	TGTGCAATCT	TTTCAGTATC	CGTCTTAGCC	GCTGTACCTG	CAGCAATGAC	720
AGCATCAACA	TCACCGTACC	AGGTTTTACC	GGTAGTGGTA	TCTTTGGCAT	TGCCAACTTT	780
GACAGGCGTT	GCCGCTTTAA	TTGTTTTTGC	CAATTGATTC	AATGCAGCAT	CTAATACCTT	840
GTTGAAGTTG	GTTTCAATTT	GATCGGCGGT	GCTAGTTCCT	GCTGTCGTTT	GCGCAGCGAC	900
AGCGTCCAGT	TCGGCATTTA	GCGTTTTACC	GGTGCTTGGA	TCGGTTTGGC	CACCTAAATC	960
AGTTCCAAAC	GCCTCTTTGG	CAGATTGTAT	CTTGTTTAGT	AGTGCAGCTT	GTTGGTCTGC	1020
TGGCAGCTTA	TCAACTAACT	GATTCAGTGC	AGTGGTCAGC	TGCGTTGTTG	CCGTTGTGAG	1080
TGTTTCAATC	GTCGCATCAG	CTTTAGCTAA	AGCAGTCTGC	GCCGATCCGA	TAGCGGTATT	1140
CAAAGCATT	GTTGTGGCGT	CAGTATATTG	AGCGCTCGTT	GCTTTTGCCT	TTGCTTGAGT	1200
AAGCAAATCC	TGCAGCGTTG	TTTTGGCCTT	TTGTAACCTG	GCCGGATCAT	CCGTCTTAAT	1260
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GCCGCCATCA	GTACTGTATT	GAACGGTCTC	ACCTGCTGCT	GCCTTGGCTG	TCAGCGTCAC	1440
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CAGTTCCAAA	TAATTAACGT	TATCTGTGCG	TGTTCCGGTG	ATACGGAAAT	TCGGATCATT	1740
CGTATAGACA	GGTTTGTCCG	TTGAGCTATC	GAGTGACAGT	GTGCGGGCAA	CAGCATCTAA	1800
AATAAAGGTC	AAGCTGTCTT	GAACCGTTTT	ATCTTGCGTG	GTATCACCAG	TTACAACGCC	1860
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TGCCCCGAAA	GTGACGCCTT	GGTCGAAGGT	CACCGCATTT	TTTAGGACAT	CGGCATCATA	2100
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CAAAGTAACC	GGTGTTGTCG	TGCCACCGTT	AGTAACCGTT	ACCTTCTTAG	TGTCGGCACT	2280
AGCTGTTCCG	GTTACTTTAA	CGGTACTTTC	GGACGTTTGA	TCTTGATTAT	CATTAACCCG	2340
CAAGTCACTA	AAAGTAGGTG	CCGCCAACCG	GACATTGCTA	TCAAAATGCT	TAACCTAAGT	2400

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CATAGTGGCT	TTGAAACTAT	TGGCATCAGC	GTCATAAGTG	GTCGTCAAAT	CATGCTGCTT	2520
TCCTTGC	TGGTATAGG	TACCATAAAC	AGCAGCTGGA	TACGTCCCGG	TAAAGGTGTA	2580
AGTGCCACCT	TGCTTCCCTG	CTTGATAGTT	AGCCGTTTGA	CTCGTGATT	TATCTGGTAA	2640
ACCACCACCA	TTAATAATCA	GATCATAAGC	AGTTGATCCG	GGCTTTTGTG	CGGAAGCTGA	2700
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AGTGGTTTTG	CCTTTTTCTT	GCCTAGACGT	TAAAGCAACA	TGACGAACCG	TTGGCGCCTT	3000
AGAGTCCAGT	GTGAATGCTA	CATCGTATGT	CTGCCGCTTG	TCGCCGCCTT	CAGGAACACC	3060
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GTCGTTATAA	AGTGCGTTCT	TATCGCTCGA	AAAGGCCACT	GCTTTATCAT	CAACCGTTTG	3360
CTTGCCACTG	GCATCCGTGA	CTAAGCCGCC	GTAATATTGA	CTGCCGGTTT	TCTTATTGGT	3420
GAGCATCGGA	ACAGTCCCAT	AATTGCCACC	AGTTGGATCG	TAAGTCACAC	CATTTCAGACT	3480
ATCCACGATC	TTCCCCTCAT	TCCAATCACC	AAAGAAGCCC	ATATATGGCA	AGTTGAGACT	3540
CGAGCCATCA	TTTCCCTTGA	AGTTCAAGAA	CCCTTCAACA	AACGTGTTGCT	GATCAAAAGT	3600
CTTAGGCACT	GAAAGCGTGA	ACGGTACCTG	CACGGATTTT	CCAGCCGGTA	CCACAATATC	3660
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<211> 1176

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 51

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GATTTTTCAA	CCCCTAAGGC	GATTGATGAC	GCAGCTATTG	CGGCGATTCA	GGCTGGTAAT	180
GCCAGTTTCT	ATACGGCAGC	AACCGGTATT	CCGGAATTAA	AGCAGGCGAT	TAGTGACCGG	240
ATATTTGCCC	AAGACGGTAT	TCGTTATGAT	CATCGTCAAA	TCGTTGCAAC	CACCGGCGCT	300
AAGTTTGCTT	TGTATGCCTT	ATTTTCAGGT	TTCTTAAACC	CAGGCGATGA	GGTGCTGATT	360
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CTGGTCATGC	CGGCAGTCGG	ACATAAAGTC	AGTGTCGATG	ATCTTGAGGC	GGCTCGGACC	480
GATAAAACCC	GGGCATTGAT	TATCAATTTC	CCACAAAACC	CAAGTGGCGT	TGTCATATGAT	540
CGCACGGAAC	TGACCTTAAT	TGGCAATTGG	GCGCTGAAGC	ATCATATTTT	GGTAGTGACT	600
GACGATATTT	ACCGAGATCT	GATTTATAAC	GGTACGACTT	ACACCTCAAT	GATTAGTATC	660
GATCCCGATA	TCGAGCGGAA	TACTGTTTTA	ATTTCCGGCG	TCTCCAAGTC	ATATGCGATG	720
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TTAACTGGCG	ATCAGCAGGT	TGTTGAAAAG	ATGCGCCGTG	CTTTTGAAGA	ACGGCTGAAT	900
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GCCTTCTATC	TTTTCCCGAA	TATTAAGCGT	GCCGCTCAAT	TGAGTCATTA	TGGTACGGTT	1020
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TTTGGCATGC	CGGATCATGC	GCGGATTAGT	TATTGTAAAG	ATTTGGCCAG	TCTGAAAGAG	1140
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CAATGATGCG	CTCAAGTGTG	ATTTGAATGT	CATGAAAACC	ATTGCGAAAC	AGAACATACC	180
GCTGCTTGGT	TTTTTGCTTA	CGTAAATGAT	TAATCATGAA	ATCATAAAGC	ACACTTTGCT	240
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TCAGCAAATC	GTTGTCGCCT	AACGCATCAA	TGGAATGCTC	ACTTCCAATA	TCCAGTAGCA	360
GCACGTCGCC	TTGTGACAGG	TGGACGCGCT	GACCGTTAAC	CGTTTCATCA	GCGTGTCTT	420
GCAACATATA	GTTTCATCTCA	AAGAACTGAT	GGGTGTGCAA	AGGATAAGGG	GCATATCGAT	480
TATGTTTGCT	GACATAAATG	GCGTGATTGC	GGAAAAATA	ATCGTTTAAA	ACCGGGACGT	540
TAGCCGTTTT	TGATTCCCGC	AAGTCAATCG	CGGTTGGCGG	AATGTCATCG	CTAAAAACAT	600
GATGCTCTTT	CTGCTTTTTT	TCGACATCAG	TCAAACCTTG	CAACTGCTTT	AAAATTGCTA	660
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CATTTTGGAC	TCAGCAGTTT	TCAAGTCGGC	TTATTACGCG	CCTTGTCAGC	CAACGCATTT	960
GGCGCAGCGC	TTGGTGCTCT	CATCGGTGGG	CCACTGTCTG	ATAAGTTTGG	TCGTAAGTTG	1020
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AACTTCCCAA	TGTTACTGGC	AGGATTTCTC	GTAAGTGGCT	TAGCAGTCGG	CGCCGGTGTT	1140
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GGTGTATCAC	AGTTTGCATG	GTCATTGGGA	CCGGCAGTTA	TTTTTCATTCT	CGGGACCGTT	1260
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GCGTTTGAAG	AGAGCTCCGG	TGAAAAGTCG	CATCCTTATC	GCACCTTGTT	CTCGAATAAA	1440
ACCTCACTTA	AATGGCTATG	CTTCCTAGTC	GGTGTTTACA	TGTTCTGGAA	CTTGGTAGCC	1500
GGCGGATGG	GCTTCTTCAT	GCCATATGTT	TATGAAACTG	CTGGCGGTCT	GTCCAATCAG	1560
GAAGCCAAGT	TACTGCAGGC	CGTGCTTTGG	GTCCCTCACCG	CCTTGCGAAC	ATATTTTGGA	1620
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GCCGCAGCAT	CTTGATCGT	ATTGACCTAC	GCCGGCATGG	CTCAGTCATG	GAGCTTATGG	1740
GCGTTTCGTAG	CATTGTGGGG	AATTAGCGCA	GGAATCGGTG	CCCAAGCATG	GTATGCATTA	1800
TGGGCAACCG	AACTCTTCCC	GACCCAATTC	CGCGCTGGCT	CACAAGGCGT	GATGTTCTTC	1860
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GGCTTCACCG	TTGCCGGAAC	TTTCATGATC	GGACTGCTAT	TAGTATCACT	TGTCATTGGC	1980
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GACACCGGCA	GCGAGCGCGT	TTCACCGCAG	TCAATTAATT	AACCAAACGA	ATGGTGTTAA	2160
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CTCATGCTGG	GTGCAATTGT	CGATGGTCAA	CTGAAACTAA	CTGAAGTTCA	TCGATTCAAA	2280
AACGGCTTCA	AAAACGAAGC	AGGGCATGAT	CGGTGGCAAA	TCGACCATAT	CATTGATGAA	2340
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AAATCCTACA	TTTATGAAAA	AACCGGCATC	CAGTTCCAGG	ACTTCAACAC	ACTTTATCAA	2580
CTTTACACTG	AAGAGCGCGA	TGATCTTGCT	AAAGCCGATA	AGATTCTGAT	GATCCCGGAC	2640
TACATTGGTT	ATGTCCTGAC	CGGCAATGCC	GTCACCGAGG	TAACCAACGC	CTCAACCACG	2700
CAAATGCTCA	ATCTGCGGCA	GGGACTTTTT	GATAAAGACT	TACTCAAAGA	AGTCAATGTT	2760
GCTCAGGATC	AGTTCCCGGC	ATTGGTTGAA	TCCGGTACGC	CGCTTGCGAA	GATCAGTCAT	2820
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<400> 53

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TTCATTGACC	TGTACTTGGG	TAAGTCCTTG	ATATAATTTT	AAAATAGGCA	CCTCTCATCT	180
TTATTTTCTA	TTATAGCATG	TATAGCATGC	TCAACGTTGC	GCGATTGCTT	CAAGTGCTTT	240
TTGAAATTCT	GCCTGCGCCA	AAGCTGTGGT	TTCTTTTGCT	TGCGCTTTCT	CCAGGAATGT	300
TGTCAAATCA	GCATTTGGGG	TTGCGGCAAG	CTCGCTTACA	GCCCATGCGG	CAGTCGCGCG	360
AATCATGGGG	CGGGGATCGG	TATCGATCAC	CTCAAGCAAA	TGAGGGACGG	CACTGCGATC	420
GTGGAGATTG	ACAAGAGCAA	TGATCGCATT	ACGTTGCAAA	GGCTTTTTC	CCCGCCAGGC	480
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GCCTTTGTGG	AACGGGCACA	CTTGCTGACA	AATATCACAG	CCGTATAAAA	CATTGCGAAT	660
CATTGGCCGA	AATTCCGGGT	CCATAAACCC	CTTTGTCTGT	GTCTGATAAG	ATAAGCAACG	720
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CAAACCTGGGA	TGGTAACAAT	CATGGTGCGT	TGGCGATTGC	TGGCGGCGGT	AGTACCTGGA	1980
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CCCAGCCATT	GAACGCCTTC	GTCAGTGCAA	TTGGCGATT	AAAATGCGAG	ATCGTAACAA	3420
GTGGCTCAAT	GTTGTAGCGC	TTGAGTTCAG	CAATCAACGC	CGCGTAAAAG	GCAAGCCCTT	3480
CTTTGCTTGG	GCCGTCGCTT	GCAGAACCGT	TTGGGTAAAT	TCTCGTCCAG	GCGATGGAGA	3540

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TAGTTTATCG	CCTGGGCAGA	CAGATGTTTT	TTCATGCACT	TCAATCCGTT	CGGGAGGCGT	3900
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ATCCCGACAG	CAGAACGGAT	ACCGGTCATA	ATACCGGGCA	GTGCGGCTGG	AAATACGATA	2460
CGGGTAAAGA	TTTGCCGAGA	ATTAGCGCCT	AGCGAGGCGG	CATTATGCCG	ATAGTCAAGA	2520
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ACATGATAAG	CGCTTAGTAA	GCCAAGTGGT	GTGCCGCTCA	TGACGGCTAG	GACAACTGCA	2760
ACTGTTACCC	GTCTCAATGT	TAGTAAATAA	TGTTCCCAA	AAGGCGTCCC	ATTGTATCCG	2820
AACTGCAAGA	GATTCACCGC	TGCTAGCCAA	ACTCGTCCCG	GCGAAGGCAA	AAGAACTGGG	2880
GACACTAAAT	GAAGCCGCGT	GGCAAGCCAC	CATAGGCTCA	AGATAACTGC	TGGTATCAAT	2940
AGCCACCCAA	AATGGCGGGA	TAGTCGATGT	TTGATGGTCA	TGATGGGATC	CTCCGTTGGC	3000
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GGAATGTTTT	TGGCAGAGAT	GATGTGACCT	TCTGCAAATT	CATCAGGCTC	CCGCACGTCA	3360
ATCAGCATCG	CGCCAGCTTC	GACTAACGGA	CGAACCATTG	AAACCATGAT	TTGTTTAAAT	3420
TCGCCGTTTA	AGATATTCGT	GGCCACCAAG	CCAGCCATAT	TCACTGCATT	CTTTGCGGTG	3480
CTAAAAGTTG	GTTGATAGCA	TAGTTCCAAG	GTCTCAAGAT	CCTCAACATA	ATTGTGATTG	3540
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TTGGTGCGGC	AAAAAGAAAT	GAAGAATGGG	AAGGCAATCC	AGGCATGACC	CTCACCTTCA	5640
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<211> 1258

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 59

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CCCAGCAGTT	TGCATGCTCT	AGGAACATAA	GCAATGAGG	TTTTGCAGAG	TTCCGCGAGC	180
CAGATTGCTA	AATTAATCGG	TGCTAAGCCG	GACGAGATTT	ATTTTACGAG	CGGTGGAAC	240
GAAGGGGATA	ACTGGGTGAT	TAAAGGCACT	GCCATGGCTA	AGCGCGAATT	TGGCCGTCAT	300
CTGATTACGA	CCAGTATCGA	GCATCCGGCT	GTGATCAATA	CGATGAAACA	GCTAGAGAAA	360
CTGGGATTTG	AAGTGACTTA	TTTGCCGGTT	GATCGGCGCG	GTTTTATTCA	TATTGACGAT	420
TTGAAAGCGG	CTATTCGCAA	AGATACGATT	TTGGTGTCTG	TTATGGCGGT	TAATAATGAA	480
ATTGGCAGTA	TGCAGCCGAT	TGTTTCAAGC	GCGCGGGTGT	TGGATAATTA	TCCGAATATT	540
CATTTTTCATG	TCGATGCTGT	ACAACVCCGT	GGTAAGGGGT	TGGATGCAGC	GTTGCAGGAT	600
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TTTATCTATG	CCAAAGAGGG	TCGCATGCTT	GATCCGTTGC	TAACCGGTGG	CGGTCAGGAA	720
CATGATTGGC	GCTCAGGCAC	GGAAAATGTT	CCGCGGATTG	CGGCGATGGC	CAAGTCGCTG	780
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ATTTTTTGAAC	ATGTCAGCCA	AAAGCCCAAG	GTGACGATGT	TTAGTCAGTT	AACACCGGAT	900
TTTGCCCCAC	ATGTTTTATG	TTTTTGCCATT	GCTGGTGTCC	GCGGCGAAAC	GATTGTTCAT	960
GCGTTTGAGG	ATCATCAGAT	TTACATTTCC	ACAACCAAGT	CCTGCTCGAG	TAAGAAAGGC	1020
ACGGAAGCA	GTACCTTGGC	CGCCATGCAT	ACGGACCCGA	AAATTGCTAC	TTCCGCGATT	1080
CGGGTGAGTT	TGGATGAAGC	TAATACTTTG	GATGAAGCGG	ATGCGTTTAA	TGCAGCGTTT	1140
GATACGATTT	ATGCAAGATT	TGCCAAGCTT	GATAAAGCGA	CCGTCTAAAC	GAGCATCAGC	1200
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<211> 1596

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 60

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AGCTTAGCAA CATCATCAGC ATTGTTGTAA ACGCCAAAGC TTGCGCGAAC GGTTGCCGGA      240
ACCCCTAATC GTGCCATCAA CGGTTGAGCG CAATGATGGC CGGCACGAAC GGCAATCTGC      300
TGCTCATCTA AAAAGGTGGC CAGATCATGG GGATGAATAC CTGCCAAGTT AAATGATACC      360
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AACCAGTGCA GCGCTGTCCC TAATCCGATC ACACCGGCAA TATTGGGCGT TCCGGCCTCA      540
TATTTAATCG GCCCTCTGC CCAAGTGCTG ACATCATCGC GGACTTCTGA AATCATTTCC      600
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CTGATCATCA ATCTCAGCCA AACC GCCTTC CAAAAAGCCG CGAATCACGA GACGTTTGGC     1440
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<211> 710

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 61

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CAATTTCTCT AAAGTGACCT CGATGCGCAA AACATCGCCG GGGCGTACCA TGTGACGGAA      240
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CAAAGCAATT GCCCCTGCTT GCGCCATCGC TTTCGATCTGC AAAACGCCCC GGAAAATCGG      360
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<211> 2695

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 62

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AACAGGTGCA ACACTTGCGC GCGAATCGCA GCATAGCGCA TGTGATTACC CTTGAAAATG      240
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ACGGTCAAAC CGCTTTGTTG CAAGTAGGAA GCCAGTTGTT CTTGCTGCTG CGCATGAAAC      420
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<211> 4861

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 63

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CAAAAGCGGC	GA CTGGATCA	CCCATGCAAA	TCAGTTAGGC	CTTTTGGAT	TGGGCGCCAG	480
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<400> 76

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GCGCCATCCC	GTCACGGCAA	AATCGGTGAA	GTGATGCATG	ACCGCCAAAG	CTACCGTATC	4920
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<400> 79

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ATACCATGGC	CGAAGAAGTT	GAAC TTACCC	AGCCGGATGT	CATGAAGTTG	TGTAAAGCTT	120
ACATGAACCC	TGAACACTTG	GCATTGCTTG	AAAAGGCCTA	TAAGTTTGCC	GCTTATGTTT	180
ATAAAGATCA	AGTTCGCAAG	TCCGGCGAGC	CTTATATTAT	TCATCCCAT	CAGGTAGCGG	240
GGATTCTTGC	CGAATTA AAA	ATGGATCCTG	AAACAGTGGC	TTCCGGCTAC	CTGCATGACG	300
TTGTGGAAGA	TACAAATATC	ACGCTGGGCG	ATATTGAAGA	AGTGTTTGGC	CATGATGTTG	360
CGGTCAATTGT	TGATGGGGTG	ACGAAGCTTA	GCAAAGTGAC	CTATGTTGCC	CATAAGGATG	420
AGCTAGCTGA	AAACCATCGA	AAAATGTTGC	TGGCGATGGC	AAAAGACTTA	CGTGTCATTA	480
TGGTGAAACT	GGCAGACCGC	CTACACAATA	TGCGCACACT	TCAACATTTA	CGCCCGGATA	540
AACAGCGGCG	GATTGCCAAT	GAAACCCTGG	AGATTTATGC	GCCACTAGCC	GACCGCTTAG	600
GGATTAGCAC	CATCAAATGG	GAAC TTGAAG	ACCTATCGCT	GCGTTATCTT	AACCCGCAAC	660
AGTACTATCG	AATTGCACAC	TTAATGAACA	GTAAGCGCAC	CGAACGTGAA	GCTTATATCC	720
AAGAAGCAAT	CGAAGAAATC	AAAAAGGCCT	TAGCGGATCT	GCATATTAAA	TATGAAATCT	780
ATGGCCGCC	AAAACACATC	TATTCCATTT	ATAAAAAAAT	GCGCGACAAG	CATAAACAGT	840
TTGACGAACT	GTATGATTTG	TTGGCAATCC	GGTCAATCAC	CGAAACGATT	AAGGATTGCT	900
ATGCGGTTTT	AGGTGCAATC	CATACTAAGT	GGAAGCCAAT	GCCAGGCCGG	TTTAAGGATT	960
ACATTGCGAT	GCCGAAAGCC	AAC TTATATC	AAAGTATTCA	TACGACCGTT	ATCGGACCGA	1020
TGGGCAAGCC	GCTAGAAGTC	CAGATTCGTA	CCGAAGAAAT	GCATCACGTG	GCTGAATACG	1080
GGGTTCGAGC	ACACTGGGCT	TACAAAGAAG	GCCAGACCAG	TAAAGTCCAG	TACGATAAAG	1140
CCGGCAAAAA	ATTGGATATC	TTCCGCGAAA	TTCTTGAGCT	ACAGGATGAA	AGTAGCGATG	1200
CCGCCGACTT	CATGGAAAGT	GTTAAAGGCG	ATATTTTCAC	CGATCGCGTT	TACGTCTTTA	1260
CCCCAAAAGG	TGATGTCTAC	GAGCTTCCAA	AAGGCAGTAA	TCCGCTTGAT	TTTGGCTATT	1320
TAATTCATAC	GGAAGTCGGC	AATCATACTG	TTGGCGCCAA	AGTGAATGGC	AAAATTGTGC	1380
CGCTTAATTA	CGTGTTAAAA	AATGGCGACA	TCGTGGAAAT	GCTGACGGCT	AGCGGCAGTG	1440
CGCTAGCCG	TGATTGGATC	AAATTGGTGT	ACACTTCGCG	CGCCCGTAAC	AAGATCAAGC	1500

GTTATTTTAA	GCAGGCCGAT	AAAAGCGAAA	ACGCTGAAAA	AGCCCGTGAT	ATGCTTGAAC	1560
ATGAGCTACA	AGAGGAAGGC	TATGTACCAA	AAGATTTTAT	GACCCAGGAA	AACATGACCG	1620
GACTCATGCA	GCGTCTGAAC	TTTCAAACCG	AAGACGAATT	AATGAGTTCG	ATTGGTTACG	1680
GGGAATATAC	GCCTAAAGTT	ATTGCTAACC	GGCTAACCGA	AAAGTTCCGT	CATGCAAAGG	1740
CTGAAAAGGA	TCGTAAGGCC	AAAGAAGCTG	CCATTTTATC	TAAGAACCAG	AAAGTCACAA	1800
CCGTTTCCAG	TGAGAAACAT	CAGCCACAAA	CCCATTCCGA	AGATGGTGTG	GTGATTGAAG	1860
GTGTCGATAA	TCTGCTGGTT	CATTTAGCAA	AGTGTGTCAT	GCCTGTACCT	GGGGATGCAA	1920
TTGTCGGCTA	TGTGACGAAA	GGCCGTGGGG	TCACAGTTCA	TCGCGCGGAT	TGCCCCAAATG	1980
TTCAAAGTTC	ACGGGAAATG	TCGGGTCGTT	TGATTGACGT	TCGCTGGGAA	AACGAAGCGG	2040
TACAAAAGCA	GCTCTTTAAT	ACGGATCTTG	AAATTTACGG	TTACAATCGC	AGTGGGCTGT	2100
TAAATGATGT	CTTACAGGTC	CTTAATGCCC	AACTAAGGC	CTTGAACAAC	ATCAATGGCC	2160
GGGTTGATCA	CGATAAAATG	GCTGATATCC	ACGTCAAAGT	CGGCGTCCGC	AACCTTGCCC	2220
ATTTGGATAA	ATTAATGGAT	GCTGTAAAAA	ATGTTCCGGA	TATTTATGAA	GTGAAGCGGG	2280
CAAAATGGGTG	ATGACCGTTT	TATTTAGACA	GCACGGGTGA	TCAGAAAGAC	ACAGATCTCA	2340
ATGATCACGA	TCCGGTGCTG	TCTTTTTATG	CCAGCAGCAT	TCACAAACAA	GATTTGATAA	2400
ATAAAGGAGA	AAAGTATATG	CGCGCAGTGG	TACAACGCAG	CCTTGCAG		2448

<210> 80

<211> 1807

<212> DNA

<213> LACTOBACILLUS RHAMNOSUS

<400> 80

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TTTAACAGTC	AACAGCCGAG	CTAGAGCCCT	GTAAATTTTC	TTTGATTATT	TTTTGTTAAT	180
TCTGCAACCG	TCACGAACAG	AGCGCCGCAC	CCAAAAGTTT	CACAGTCAAT	CAGTCAGTTT	240
GATCAGGTAA	CCGCTTTCTT	AATGAGCTAT	ACTTGTTATA	AAAAGGAGTT	CCATTATGAA	300
AGCCCCCACA	CAACCAATTG	TTGTTCACTT	TCCATTACGC	GGCGAATGGT	TGGCACCCAA	360
TACGCCCTGGG	TCTAAGGTTT	CAAGCCATGG	TTCTAACAAA	TTCGGGACGC	GTTATGCGTA	420
TGATTTTATT	CAGGTCAACT	GGCAGAAACT	TGGTCGTCCT	GCCTACCGCG	GTAGTTTGT	480
GAAGTATCTA	TTCCGCGGCA	TTCCGATTGA	CGACTATTAT	TGTTATGGCC	AGCCGATTTA	540
TGCGCCAGCC	AACGGTTTGG	TTGTCCGCGC	AGAGGATCAT	TATCCTGAAC	GGAAGCGGAC	600
CAGCTTTTTA	GGCGACTTAC	TTCCGGCAAG	AAACGCTGCC	CGGCATTTTG	ACCCAAAAAG	660
AAACAACGTT	CAGGCAGTTG	CCGGAACCTT	TGTTATCTTA	CAAATACACG	ATCATGTTTA	720
CGCCGCCTTG	TGTCATCTTC	AAACAGACTC	TATTCAGGTT	GGGCGCGGAC	AAACGGTCCA	780
GGCAGGTGAT	TTGCTTGGGC	GCGTGGGACA	TTCCGGCAAC	TCATTTGGCC	CGCACCTTCA	840
TTTTCAATC	ATGAACAACA	GTGACATTGA	AGTTGCGGCT	GGCCTTCCTT	GTGCATTTGC	900
CGAATATGAG	CTTTTCGCCG	GAAATTCATG	GCTAACCCAA	GAAAACGCTG	TTCCCAGCAA	960
AACAGACCGA	ATTTGCTTTG	TGTCACCTAA	GTCTGGACCT	TTTTAAAAGG	GTACGCTTCT	1020
TTGTGGGCCG	TGATGACCGT	GAAGCTGTTT	GCGTCAACTA	CCCGTCGCTA	AAGTATCGGG	1080
CTTGTGACTC	ACGCTGCTCA	ACCGGCAGCA	GTAGTGCAAA	TGCCTAACGG	CTCCTACTTA	1140
TGTGGTCACA	TCTCAGATCG	TGTTTCAACG	GTCTCGGGGG	CAGACAACCTC	CCGCAGATGC	1200
ATAGTTTCT	CTACCCAGTC	TGCTTGTGCG	CGTAACACGG	CTTGACAATC	CCGGCCAGCC	1260
ACTGGTTTCC	CAGTTGCTGG	ATGTTTCATGG	CGGTGACTG	GTCGTCATTG	GCATGGAAGC	1320
CACAGACACA	GACGTATTCA	TGGCGCTCGT	GATCCCGCTG	CTGTTTCTTG	ATCACGCCAC	1380
ACTGTGGACA	GCGTTGGCTG	GTATAACCAG	CAGGCACTTT	CAGCACGCGG	CTGCCTTGCG	1440
CAGCAGCTTT	GTATATCAGA	AACTGTTCCA	ACTGGTAAAA	CGGCCAACTG	ACCTGTTTCAT	1500
AGCGTCGGTC	TTGAGCAACT	TTTGCGGTTG	CACAACGAAC	ATCAGTCAGA	TCTTCCAGCA	1560
CAAAACAGGT	ATTTGCCCCG	CAACAGTCGG	CGAGTGCCTT	AGCCGCACGA	TGGTTTTCTG	1620
TTGACATCCA	GCGGTTCTCT	CGCTGACGGA	TTCGTTTCAG	GACGCGTTTT	GCTGATTTTCG	1680
TTCTTTTGGC	TTGAAGTTTG	GCCCCAGGT	ACTTGTACCG	CTGCCGCTTG	TTGAGCGCTC	1740
TGGTCCCTGA	CCAATAGGTG	GTCCGGCCGG	TCTCGTCAAA	CGCGGTGGCT	AAAAAACGCA	1800
GTCTCTCG						1807

<210> 81

<211> 485

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 81

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PHE ASN ALA ASP PHE VAL TRP GLY ALA ALA THR SER GLY PRO GLN ALA  
20 25 30  
GLU GLY THR PHE HIS LYS LYS HIS GLU ASN ILE PHE ASP TYR HIS TYR  
35 40 45  
HIS THR ARG PRO GLN ASP PHE HIS HIS ASN VAL GLY PRO ASP VAL ALA  
50 55 60  
SER ASN PHE TYR ASN ASP TYR ILE ALA ASP LEU LYS LEU LEU LYS ARG  
65 70 75 80  
ALA GLY VAL GLN ALA LEU ARG ILE SER ILE GLN TRP THR ARG LEU ILE  
85 90 95  
ASP ASP LEU GLU GLU ALA THR VAL ASP GLN ALA GLY ALA ASP TYR TYR  
100 105 110  
ARG ARG VAL PHE ALA GLU MET HIS ASP LEU GLY ILE THR PRO TYR VAL  
115 120 125  
ASN LEU HIS HIS PHE ASP LEU PRO VAL VAL LEU GLN HIS GLN TYR GLY  
130 135 140  
GLY TRP GLN SER LYS HIS VAL VAL GLU LEU TYR ALA LYS PHE ALA ALA  
145 150 155 160  
ARG CYS PHE GLU LEU PHE SER ASP GLN VAL THR HIS TRP PHE THR PHE  
165 170 175  
ASN GLU PRO LYS VAL ILE VAL ASP GLY GLN TYR LEU TYR GLN PHE HIS  
180 185 190  
TYR PRO ASN ILE VAL ASP GLY LYS ALA ALA VAL GLN VAL ALA TYR ASN  
195 200 205  
LEU ASN LEU ALA SER ALA LYS ALA ILE ALA VAL PHE ARG LYS LEU ASN  
210 215 220  
ARG ASN PRO LYS GLY THR ILE GLY THR ILE ILE ASN LEU THR PRO VAL  
225 230 235 240  
TYR PRO ALA SER GLN ALA ASP ASN ASP ARG ALA ALA ALA HIS PHE ALA  
245 250 255  
GLU LEU TRP ALA ASN ASP LEU TYR MET GLU PRO ALA ILE HIS GLY TYR  
260 265 270  
PHE PRO GLU GLU LEU VAL ASP ARG LEU GLU ARG ASP GLY VAL LEU TRP  
275 280 285  
ASP ALA THR PRO ASP GLU LEU ASP ILE ILE SER ALA ASN ARG ILE ASP  
290 295 300  
VAL LEU GLY VAL ASN TYR TYR HIS PRO PHE ARG VAL GLN ALA PRO ALA  
305 310 315 320  
ILE ASP PRO GLU SER LEU GLN PRO TRP LEU PRO ASP ILE TYR PHE ASP  
325 330 335  
HIS TYR GLU LEU PRO GLY ARG LYS MET ASN LEU ASP LYS GLY TRP GLU  
340 345 350  
ILE TYR PRO ALA ALA LEU TYR ASP ILE ALA MET ASN ILE LYS ASP ARG  
355 360 365  
TYR ASP ASN ILE PRO TRP PHE VAL ALA GLU ASN GLY ILE GLY VAL ALA  
370 375 380  
ASP GLU THR ARG PHE LEU LYS ASP GLY VAL ILE GLN ASP ASP TYR ARG  
385 390 395 400  
ILE ARG PHE MET THR GLU HIS LEU GLN PHE LEU ASN ARG ALA ILE ALA  
405 410 415  
LYS GLY ALA ASN CYS HIS GLY TYR PHE SER TRP THR GLY ILE ASP CYS

420                      425                      430  
 TRP SER TRP LEU ASN ALA TYR LYS ASN ARG TYR GLY LEU ILE ARG ASN  
 435                      440                      445  
 ASP LEU ARG THR GLN THR LYS SER LEU LYS LYS SER GLY TYR TRP PHE  
 450                      455                      460  
 GLN LYS VAL SER SER THR GLY HIS VAL PRO GLU LEU ALA MET GLN SER  
 465                      470                      475                      480  
 GLY ASN LYS GLY ARG  
 485

<210> 82  
 <211> 411  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 82  
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 1                      5                      10                      15  
 ALA VAL ASP ILE GLY VAL ALA VAL LYS PRO GLY ASP THR VAL TYR VAL  
 20                      25                      30  
 GLN ILE SER VAL ASP GLN ALA GLN MET ALA ARG LEU ILE VAL GLU ALA  
 35                      40                      45  
 ALA TYR GLN ARG GLY ALA ALA GLU VAL GLN VAL GLN TRP PHE ASP ASP  
 50                      55                      60  
 VAL LEU LYS ARG LEU ASP MET ALA HIS MET ALA ASN GLU ARG LEU PHE  
 65                      70                      75                      80  
 ASN ILE PRO ALA PHE VAL LYS GLY GLN PHE ASP TYR TRP VAL ASP HIS  
 85                      90                      95  
 GLN ALA LYS ARG ILE THR VAL VAL SER SER ASP PRO ASP ASN LEU ALA  
 100                      105                      110  
 GLY ILE ASP SER ASN ARG ILE ALA LYS TYR GLN GLU ALA PHE ALA LYS  
 115                      120                      125  
 ALA TYR LYS ARG LEU MET GLU ALA ILE SER SER MET SER ILE SER TRP  
 130                      135                      140  
 THR ILE ILE GLY ALA ALA SER PRO ARG TRP ALA GLN LYS VAL PHE PRO  
 145                      150                      155                      160  
 ASP ALA ALA THR PRO GLU GLU ALA THR GLU LEU LEU TRP GLU ALA ILE  
 165                      170                      175  
 PHE LYS THR THR ARG ILE ASP GLN PRO ASP PRO GLU ALA ALA TRP LYS  
 180                      185                      190  
 ALA HIS ASP GLN LYS LEU ARG GLU LYS ALA ALA TRP LEU ASN ASN GLU  
 195                      200                      205  
 GLN PHE ASP GLN LEU HIS TYR MET ALA PRO GLY THR ASP LEU VAL VAL  
 210                      215                      220  
 GLY LEU PRO LYS ASN HIS ILE TRP GLU GLY ALA GLY ALA PHE ASN PRO  
 225                      230                      235                      240  
 ARG GLY GLU GLU PHE MET ALA ASN MET PRO THR GLU GLU VAL PHE THR  
 245                      250                      255  
 ALA PRO ASP PHE ARG ARG ILE ASP GLY THR VAL ALA SER THR LYS PRO  
 260                      265                      270  
 LEU SER TYR GLY GLY ASN ILE LEU GLU ASP MET HIS PHE THR PHE LYS  
 275                      280                      285  
 ASP GLY GLN ILE VAL GLU ALA HIS ALA LYS GLN GLY ASP ASP VAL LEU  
 290                      295                      300  
 GLN ASN LEU LEU LYS THR PRO GLY ALA ARG SER LEU GLY GLU VAL SER  
 305                      310                      315                      320  
 LEU VAL PRO ASP PRO SER PRO ILE SER GLN SER GLY LEU ILE PHE PHE

325 330 335  
 ASN THR LEU PHE ASP GLU ASN ALA SER ASP HIS MET ALA LEU GLY GLN  
 340 345 350  
 ALA TYR PRO PHE SER VAL LYS ASP GLY VAL ALA MET THR ASN GLU GLN  
 355 360 365  
 ARG ALA ALA ALA GLY LEU ASN GLN SER PRO THR HIS VAL ASP PHE MET  
 370 375 380  
 MET GLY SER ALA ALA MET ASN ILE ASP GLY ILE LYS PRO ASP GLY THR  
 385 390 395 400  
 ILE ILE PRO ILE PHE ARG ASN GLY ASP TRP ALA  
 405 410

<210> 83  
 <211> 448  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 83  
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 LEU GLN ALA THR PRO ALA ALA ASN ALA LEU GLN LYS ALA VAL MET ASN  
 20 25 30  
 ASN GLY ILE ASN ALA THR ALA GLU ASN THR ASP SER LYS VAL ALA MET  
 35 40 45  
 THR PRO THR PHE SER ILE GLU LEU ASP THR GLY ALA VAL SER ASN GLN  
 50 55 60  
 LYS GLN SER GLY ARG CYS TRP MET PHE ALA ALA LEU ASN THR MET ARG  
 65 70 75 80  
 HIS GLY ILE GLN ALA GLN PHE LYS ILE LYS ASP PHE GLU LEU SER GLN  
 85 90 95  
 ASN TYR THR PHE PHE TRP ASP LYS PHE GLU LYS SER ASN TYR PHE TYR  
 100 105 110  
 GLU ASN VAL LEU LYS THR ALA ASP GLN PRO LEU TYR SER ARG LYS VAL  
 115 120 125  
 ALA PHE LEU LEU ALA THR PRO GLN GLN ASP GLY GLY GLN TRP ASP MET  
 130 135 140  
 LEU SER ALA LEU ILE GLU LYS TYR GLY ILE VAL PRO LYS SER VAL MET  
 145 150 155 160  
 PRO GLU THR TYR SER SER SER LYS SER ASN GLU LEU ASN GLY LEU LEU  
 165 170 175  
 ASN LEU LYS LEU ARG LYS ASP ALA VAL THR LEU ARG LYS LEU VAL ALA  
 180 185 190  
 ASP LYS ALA SER ASP ALA ASP ILE GLU ALA ALA LYS GLN LYS MET LEU  
 195 200 205  
 ALA GLU ASP TYR ARG ILE TRP ALA TYR THR LEU GLY ASN PRO PRO THR  
 210 215 220  
 LYS PHE ASP PHE GLU TYR ARG ASP ASP ASP LYS ASN TYR HIS ILE ASP  
 225 230 235 240  
 ARG GLU LEU THR PRO GLN THR PHE PHE LYS LYS TYR VAL GLY TRP ASN  
 245 250 255  
 LEU ASP ASP TYR GLN SER ILE ILE ASN ALA PRO THR ALA ASP LYS PRO  
 260 265 270  
 TYR LYS HIS LEU TYR THR VAL GLU MET LEU GLY ASN VAL VAL GLY GLY  
 275 280 285  
 ARG GLU VAL ARG HIS LEU ASN LEU ASP ILE ASP THR PHE LYS ASP LEU  
 290 295 300  
 ALA ILE LYS GLN LEU LYS ALA GLY GLU SER VAL TRP PHE GLY SER ASP



305                    310                    315                    320  
 VAL GLY GLN SER SER ASP ARG GLN LEU GLY ILE LEU ASP THR ASN ILE  
                          325                    330                    335  
 TYR LYS LYS ASP ASP LEU PHE ASN THR ASP PHE THR MET THR LYS ALA  
                          340                    345                    350  
 GLU ARG LEU ASP TYR GLY GLU SER LEU MET THR HIS ALA MET VAL LEU  
                          355                    360                    365  
 THR GLY VAL ASP LEU VAL ASP GLY LYS PRO THR LYS TRP LYS VAL GLU  
                          370                    375                    380  
 ASN SER TRP GLY GLU LYS VAL GLY GLU LYS GLY TYR PHE VAL ALA SER  
 385                    390                    395                    400  
 ASP ALA TRP PHE ASP GLN PHE VAL TYR GLN VAL VAL ILE SER LYS LYS  
                          405                    410                    415  
 TYR LEU PRO ALA GLU LEU GLN ASP VAL ILE LYS ASN GLU TYR ASP LYS  
                          420                    425                    430  
 PRO THR VAL LEU ALA PRO TRP ASP PRO MET GLY ALA LEU ALA SER ARG  
                          435                    440                    445

<210> 84

<211> 365

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 84

MET LEU ARG ASN SER ILE ALA GLY LEU PRO ASP TYR VAL SER ASP SER  
 1                    5                    10                    15  
 THR PRO GLU ARG ILE ALA LYS ALA ALA GLY LEU ALA LYS MET THR ARG  
                          20                    25                    30  
 LEU SER PHE ASN GLU ASN PRO VAL GLY THR SER PRO LYS VAL GLN ALA  
                          35                    40                    45  
 ALA LEU GLU ASN TRP ALA PHE SER GLN ALA ARG ASN TYR PRO ASP PRO  
                          50                    55                    60  
 ASP ALA LEU PRO LEU ARG THR ALA VAL ALA LYS ARG LEU ASP ILE PRO  
 65                    70                    75                    80  
 ALA GLU GLN LEU LEU PHE SER SER GLY LEU ASP GLU MET ILE ALA LEU  
                          85                    90                    95  
 ILE CYS ARG THR PHE LEU GLU VAL GLY ASP GLU SER LEU GLN PRO TRP  
                          100                    105                    110  
 PRO THR TYR PRO GLU TYR GLN LEU GLN ALA ALA ILE ALA GLY ALA THR  
                          115                    120                    125  
 THR ILE ASN ALA PRO VAL ILE ALA ALA THR GLY LEU ILE ASP LEU ASP  
                          130                    135                    140  
 ALA LEU LEU ALA HIS ILE THR THR LYS THR LYS VAL ILE TRP VAL CYS  
 145                    150                    155                    160  
 ASN PRO ASN ASN PRO THR GLY THR TYR LEU PRO PRO ASP GLN ILE ALA  
                          165                    170                    175  
 GLN VAL MET LYS GLN VAL PRO PRO ASN ILE LEU VAL VAL VAL ASP GLU  
                          180                    185                    190  
 ALA TYR ILE ASP PHE VAL ASN GLN PRO GLU PRO SER THR LEU SER LEU  
                          195                    200                    205  
 THR HIS GLN PHE PRO ASN LEU LEU VAL MET ARG THR PHE SER LYS LEU  
                          210                    215                    220  
 TYR GLY LEU ALA ASN PHE ARG VAL GLY PHE SER ILE VAL PRO LYS ALA  
 225                    230                    235                    240  
 LEU ILE PRO LYS MET GLN ASN VAL ARG LEU PRO TYR ASN ILE SER GLY  
                          245                    250                    255  
 MET SER GLN ALA ALA ALA LEU ALA ALA TRP GLU ASP GLN THR PHE THR

260 265 270  
 ARG LYS VAL LYS GLN GLN ILE PHE ALA ALA ARG LYS GLN TRP HIS GLN  
 275 280 285  
 PHE PHE ASP GLN HIS GLN ILE ARG HIS TYR ALA THR GLN THR ASN PHE  
 290 295 300  
 MET LEU TYR GLN VAL ASN ASP PRO GLN ALA LEU GLY THR PHE LEU LYS  
 305 310 315 320  
 GLN HIS GLY TYR LEU VAL ARG ASP SER MET VAL PRO GLY TRP ILE ARG  
 325 330 335  
 GLN SER PHE GLY THR PRO LYS GLN ASP ALA GLU VAL GLN GLN LEU LEU  
 340 345 350  
 LEU THR PHE LEU GLY ILE LYS GLN THR SER ASN ILE SER  
 355 360 365

<210> 85  
 <211> 350  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 85  
 MET PRO LEU LYS SER GLY ASN THR THR LEU LYS ARG ASN GLU ALA ALA  
 1 5 10 15  
 MET THR THR TYR ALA ARG ALA HIS THR ASN ILE ALA LEU ILE LYS TYR  
 20 25 30  
  
 TRP GLY LYS ALA ASN LYS GLN LEU MET LEU PRO ALA THR SER SER ILE  
 35 40 45  
 SER LEU THR LEU ASN ASP PHE TYR THR ASP THR ALA VAL THR PHE ASP  
 50 55 60  
 PRO GLU LEU ASN GLN ASP GLN LEU THR LEU ASN HIS GLN MET GLN SER  
 65 70 75 80  
 PRO THR ALA VAL SER ARG PHE LEU ASP HIS VAL ARG HIS LEU ALA GLN  
 85 90 95  
 ILE ASP THR ARG ALA ARG VAL THR SER LEU ASN HIS VAL PRO THR ALA  
 100 105 110  
 ALA GLY LEU ALA SER SER ALA SER ALA PHE ALA ALA LEU ALA LEU ALA  
 115 120 125  
 ALA SER ARG ALA ALA GLY LEU ASN LEU THR PRO THR ALA LEU SER ARG  
 130 135 140  
 LEU ALA ARG ARG GLY SER GLY SER ALA THR ARG SER ILE PHE GLY GLY  
 145 150 155 160  
 ALA VAL ILE TRP HIS ARG GLY SER ASP GLN SER SER PHE ALA GLU  
 165 170 175  
 PRO LEU THR ILE GLN PRO THR LEU PRO LEU ARG MET LEU VAL VAL THR  
 180 185 190  
 VAL SER ASP GLN LYS LYS ALA VAL SER SER ARG THR GLY MET ALA ASN  
 195 200 205  
 THR VAL ALA THR SER PRO TYR TYR GLN ALA TRP VAL GLN SER ASN GLU  
 210 215 220  
 ALA LEU ILE SER PRO MET ILE THR ALA LEU ALA GLU ASN ASP LEU THR  
 225 230 235 240  
 THR ILE GLY ALA LEU THR GLU LEU SER SER MET ARG MET HIS ALA ALA  
 245 250 255  
 ILE MET ALA GLU GLU PRO PRO PHE THR TYR PHE LEU PRO GLU THR LEU  
 260 265 270  
 ARG ALA TRP GLN LEU VAL GLN GLU GLN ARG ALA LEU GLY ILE PRO ALA

275                      280                      285  
 PHE ALA THR MET ASP ALA GLY PRO ASN VAL LYS ILE LEU THR THR ALA  
 290                      295                      300  
 PRO TYR VAL ASP VAL LEU MET THR ALA LEU GLN PRO VAL PHE GLY ASP  
 305                      310                      315                      320  
 ARG ILE LEU SER THR ARG LEU GLY PRO ASP ALA GLN VAL ILE THR LYS  
 325                      330                      335  
 GLU GLN PHE ASN ASP THR GLU SER ALA ILE THR SER GLN GLY  
 340                      345                      350

<210> 86

<211> 359

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 86

MET ARG LEU LYS GLN LEU VAL ALA GLY ALA ILE THR VAL ALA THR LEU  
 1                      5                      10                      15  
 ALA GLY VAL GLY VAL SER GLY PHE ALA ALA THR THR VAL HIS ALA ALA  
 20                      25                      30  
 ASP ASP LYS ALA SER LEU GLN ALA GLN ASN ASP ASP LEU LEU LYS GLN  
 35                      40                      45  
 VAL GLN ALA ALA ASN GLU LYS SER ALA LYS LEU ASN ASN GLU VAL SER  
 50                      55                      60  
 ASN LYS VAL LEU ALA ILE GLN ASP ALA GLU ALA LYS ILE LYS ASP SER  
 65                      70                      75                      80  
 GLN ALA LYS ILE ALA ASP PHE ALA THR GLN LEU THR LYS ALA ASN GLN  
 85                      90                      95  
 GLU VAL SER LYS ARG LYS SER ASN LEU LYS ASP GLN LEU ILE SER LEU  
 100                      105                      110  
 GLN LYS ARG ALA GLY ASP SER VAL THR GLY ASN VAL TYR PHE ASP PHE  
 115                      120                      125  
 ILE LEU ASN SER ASP SER LEU THR ASP LEU VAL GLY ARG SER LEU THR  
 130                      135                      140  
 VAL SER LYS LEU SER GLN ALA SER ALA GLU ALA LEU GLN ALA VAL LYS  
 145                      150                      155                      160  
 ASP SER GLU ALA LYS VAL LYS ASN LEU LYS ALA ALA GLN ALA ASN GLN  
 165                      170                      175  
 LYS ASN LEU VAL ALA THR LYS SER GLN LEU GLU SER ASP LYS ALA LYS  
 180                      185                      190  
 ILE ASP GLY LEU LYS ALA ASP ALA ASP LYS ALA ALA ASP ALA GLN  
 195                      200                      205  
 GLN THR ILE ASP ALA ASN LYS GLU LYS LEU ALA ALA MET ALA ALA ASP  
 210                      215                      220  
 GLU ALA ALA LYS ALA GLU ALA ALA GLN LYS ALA VAL THR ALA VAL ALA  
 225                      230                      235                      240  
 SER SER THR ALA SER ALA SER SER THR SER ALA SER SER SER THR THR  
 245                      250                      255  
 ALA SER SER ASN SER LEU GLY SER SER LYS ALA ALA SER SER GLN ALA  
 260                      265                      270  
 PRO ALA SER ALA GLY SER SER THR VAL SER VAL SER GLY GLY SER ILE  
 275                      280                      285  
 ALA GLY ASN ALA ALA LYS TYR LEU GLY VAL PRO TYR VAL TYR GLY GLY  
 290                      295                      300  
 THR SER PRO ALA GLY PHE ASP CYS SER GLY LEU ILE TYR TYR ALA ALA  
 305                      310                      315                      320

LYS GLU ALA GLY ILE SER LEU PRO ARG THR SER GLN ALA GLN SER THR  
                   325                  330                  335  
 LEU GLY SER TYR VAL SER VAL SER ASP LEU SER PHE LEU MET ARG ARG  
                   340                  345                  350  
 PHE SER GLU VAL ILE ARG ARG  
                   355

<210> 87  
 <211> 396  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<220>  
 <221> VARIANT  
 <222> (1)...(396)  
 <223> XAA = ANY AMINO ACID

<400> 87  
 MET ALA GLU LYS GLU HIS TYR GLU ARG THR LYS PRO HIS VAL ASN ILE  
   1                  5                  10                  15  
 GLY THR ILE GLY HIS VAL ASP HIS GLY LYS THR THR LEU THR ALA ALA  
                   20                  25                  30  
  
 ILE THR LYS VAL LEU SER GLU LYS GLY LEU ALA GLN ALA GLN ASP TYR  
                   35                  40                  45  
 ALA SER ILE ASP ALA ALA PRO GLU GLU LYS GLU ARG GLY ILE THR ILE  
                   50                  55                  60  
 ASN THR ALA HIS VAL GLU TYR GLU THR GLU LYS ARG HIS TYR ALA HIS  
   65                  70                  75                  80  
 ILE ASP ALA PRO GLY HIS ALA ASP TYR VAL LYS ASN MET ILE XAA GLY  
                   85                  90                  95  
 PRO ALA HIS MET ALA GLY ALA ILE LEU VAL VAL ALA ALA ILE ASP GLY  
                   100                  105                  110  
 SER MET PRO GLN THR ARG GLU HIS ILE LEU LEU ALA ARG GLN VAL GLY  
                   115                  120                  125  
 VAL ASP TYR ILE VAL VAL PHE LEU ASN LYS THR ASP LEU VAL ASP ASP  
                   130                  135                  140  
 PRO GLU LEU ILE ASP LEU VAL GLU MET XAA VAL ARG GLU LEU LEU SER  
   145                  150                  155                  160  
 GLU TYR ASP TYR PRO GLY ASP ASP ILE PRO VAL LEU ARG GLY SER ALA  
                   165                  170                  175  
 LEU LYS ALA LEU GLU GLY ASP PRO GLU GLN GLU LYS VAL ILE MET GLU  
                   180                  185                  190  
 LEU MET ASP THR ILE ASP GLU TYR ILE PRO THR PRO VAL ARG GLU THR  
                   195                  200                  205  
 ASP LYS PRO PHE LEU MET PRO VAL GLU ASP VAL PHE THR ILE THR GLY  
                   210                  215                  220  
 ARG GLY THR VAL ALA SER GLY ARG ILE ASP ARG GLY THR VAL LYS VAL  
   225                  230                  235                  240  
 GLY ASP GLU VAL GLU ILE ILE GLY LEU LYS PRO ASP VAL LEU LYS SER  
                   245                  250                  255  
 THR VAL THR GLY LEU GLU MET PHE ARG LYS THR LEU ASP LEU GLY GLU  
                   260                  265                  270  
 ALA GLY ASP ASN VAL GLY VAL LEU LEU ARG GLY ILE ASN ARG ASP GLN  
                   275                  280                  285  
 VAL GLU ARG GLY GLN VAL LEU ALA LYS PRO GLY SER ILE GLN LEU HIS

290                      295                      300  
 ASN LYS PHE LYS GLY GLU VAL TYR ILE LEU THR LYS GLU GLU GLY GLY  
 305                      310                      315                      320  
 ARG HIS THR PRO PHE PHE SER ASN TYR ARG PRO GLN PHE TYR PHE HIS  
                     325                      330                      335  
 THR THR ASP VAL THR GLY VAL ILE GLU LEU PRO ASP GLY VAL GLU MET  
                     340                      345                      350  
 VAL MET PRO GLY ASP ASN VAL THR PHE GLU VAL ASP LEU ILE ALA PRO  
                     355                      360                      365  
 VAL ALA ILE GLU LYS GLY THR LYS PHE THR VAL ARG GLU GLY GLY ARG  
                     370                      375                      380  
 THR VAL GLY ALA GLY VAL VAL SER GLU ILE LEU ASP  
 385                      390                      395

<210> 88

<211> 478

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 88

LEU SER ALA PHE PRO LYS ASP PHE LEU TRP GLY GLY ALA VAL ALA ALA  
 1                      5                      10                      15  
 HIS GLN PHE GLU GLY GLY TRP SER ALA ASP GLY LYS GLY ILE SER ILE  
                     20                      25                      30  
 ALA ASP VAL MET THR ALA GLY ASP ASN GLN THR LYS ARG ARG ILE THR  
                     35                      40                      45  
 ASP GLY VAL GLN PRO GLY GLU ASN TYR PRO ASN HIS ASP ALA ILE ASP  
                     50                      55                      60  
 PHE TYR HIS ARG TYR LYS ASP ASP VAL GLU LEU PHE SER GLU LEU GLY  
 65                      70                      75                      80  
 LEU LYS CYS PHE ARG THR SER ILE ALA TRP SER ARG ILE PHE PRO LYS  
                     85                      90                      95  
 GLY ASP GLU GLU GLN PRO ASN GLU LYS GLY LEU GLN PHE TYR ASP ASP  
                     100                      105                      110  
 LEU PHE ASP ASP LEU LEU ALA HIS HIS ILE GLU PRO VAL ILE THR LEU  
                     115                      120                      125  
 SER HIS PHE GLU MET PRO TYR HIS LEU VAL GLN ALA TYR GLY GLY TRP  
                     130                      135                      140  
 ARG ASN ARG LYS LEU ILE GLY PHE PHE VAL LYS PHE ALA LYS VAL VAL  
 145                      150                      155                      160  
 PHE ASP ARG TYR LYS ASP LYS VAL LYS TYR TRP MET THR PHE ASN GLU  
                     165                      170                      175  
 ILE ASN ASN GLN VAL GLY MET LEU ASN GLU TRP SER LEU PHE THR ASN  
                     180                      185                      190  
 SER GLY LEU ILE ILE HIS PRO GLY GLU ASN LYS GLU GLN ALA MET PHE  
                     195                      200                      205  
 GLN ALA ALA HIS TYR GLU ALA VAL ALA SER ALA LEU ALA VAL GLN ILE  
                     210                      215                      220  
 GLY HIS THR ILE ASN SER ASP PHE LYS ILE GLY CYS MET VAL ALA MET  
 225                      230                      235                      240  
 GLY PRO VAL TYR PRO ALA THR PRO ASN PRO ASN ASP VAL PHE LYS ALA  
                     245                      250                      255  
 GLU ARG MET MET GLN THR ASN TYR TYR LEU ALA ASP VAL GLN VAL LYS  
                     260                      265                      270  
 GLY HIS TYR PRO ALA PHE LEU GLU HIS TYR PHE ALA ARG ARG GLN PHE  
                     275                      280                      285  
 ASN LEU ASP ILE THR LEU GLU ASP ARG ASP VAL LEU LEU ALA GLY LYS

290                      295                      300  
 VAL ASP TYR ILE GLY PHE SER TYR TYR ALA SER HIS VAL ILE LYS ALA  
 305                      310                      315                      320  
 ALA ASP GLU GLU PRO THR ASP PHE ILE THR LEU GLY SER ASN GLN GLU  
                     325                      330                      335  
 ILE LYS ASN THR THR LEU HIS ARG SER ASP TRP GLY TRP GLU ILE ASP  
                     340                      345                      350  
 PRO VAL GLY LEU ARG TYR ALA LEU ASN TRP PHE SER ASP ARG TYR ASP  
                     355                      360                      365  
 VAL PRO LEU PHE ILE VAL GLU ASN GLY LEU GLY ALA PHE ASP LYS VAL  
                     370                      375                      380  
 GLU GLU ASN GLY SER ILE HIS ASP ASP TYR ARG ILE ASP TYR LEU ARG  
 385                      390                      395                      400  
 GLN HIS ILE GLU GLN MET LYS LEU ALA VAL GLU VAL ASP GLY VAL LYS  
                     405                      410                      415  
 LEU MET GLY TYR THR PRO TRP GLY ILE ILE ASP LEU VAL SER ALA GLY  
                     420                      425                      430  
 THR GLY GLN MET GLU LYS ARG TYR GLY VAL ILE TYR VAL ASP LYS ASP  
                     435                      440                      445  
 ASP GLN GLY LYS GLY THR LEU ALA ARG SER LYS LYS ASP SER PHE ASP  
                     450                      455                      460  
 TRP PHE HIS LYS VAL ILE GLN SER ASN GLY GLU ASP LEU THR  
 465                      470                      475

<210> 89

<211> 252

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 89

MET PRO THR LEU SER GLU TYR LYS THR LEU LEU GLN ALA ASP HIS VAL  
 1                      5                      10                      15  
 ASP PRO ALA VAL LEU THR ALA LEU GLU GLN ASP SER ARG ILE GLY ALA  
                     20                      25                      30  
 ARG LYS LEU LEU ALA ALA TYR GLN ARG ARG GLN ASP HIS GLN ALA ALA  
                     35                      40                      45  
 GLU ALA VAL ALA LEU ARG TYR ARG SER ARG TYR GLU ARG LYS LEU TRP  
                     50                      55                      60  
 LYS MET TYR SER HIS VAL ALA GLY LEU ASP GLU VAL GLY ARG GLY PRO  
 65                      70                      75                      80  
 LEU ALA GLY PRO VAL VAL THR ALA ALA VAL ILE LEU PRO HIS GLN PHE  
                     85                      90                      95  
 LYS TRP PRO VAL ASN ASP SER LYS GLN LEU THR ALA HIS GLU ARG ASP  
                     100                      105                      110  
 VAL LEU TYR PRO HIS ILE LEU THR GLU ALA ILE ALA VAL GLY ILE GLY  
                     115                      120                      125  
 VAL ALA ASP ASN HIS GLU ILE ASP ARG GLU ASN ILE TYR HIS ALA THR  
                     130                      135                      140  
 GLU LEU ALA MET ALA GLN ALA VAL SER HIS LEU ARG VAL ALA PRO GLU  
 145                      150                      155                      160  
 PHE LEU LEU VAL ASP ALA MET HIS VAL PRO VAL ASN LEU PRO GLN GLU  
                     165                      170                      175  
 ARG LEU ILE LYS GLY ASP ALA ASN SER ILE SER ILE ALA ALA ALA SER  
                     180                      185                      190  
 ILE VAL ALA LYS VAL ILE ARG ASP ARG LEU MET VAL MET TYR ASP ARG  
                     195                      200                      205  
 VAL TYR PRO GLY TYR ASP PHE LYS ASP ASN MET GLY TYR GLY THR LYS

210                      215                      220  
 ALA HIS LEU ALA GLY LEU ALA THR HIS GLY VAL THR PRO ILE HIS ARG  
 225                      230                      235                      240  
 ARG SER PHE GLY PRO VAL ARG HIS CYS LEU LYS SER  
                     245                      250

<210> 90  
 <211> 281  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 90  
 MET HIS PHE ARG ARG ILE ASN TYR ILE PRO ASP ALA ARG SER SER MET  
 1                      5                      10                      15  
 ARG LYS TYR ALA SER SER TYR TYR ARG HIS VAL HIS TRP VAL GLU SER  
                     20                      25                      30  
 GLN ARG HIS ILE GLU ALA TRP HIS MET THR ALA PRO ASP ASN GLN ARG  
                     35                      40                      45  
 LEU GLU ALA LEU TRP LEU PRO HIS PRO GLY SER GLN LYS ALA VAL ILE  
                     50                      55                      60  
 ILE GLY HIS GLY TYR LYS GLY THR GLY ILE THR MET SER ASN PHE ALA  
 65                      70                      75                      80  
 HIS MET PHE TYR ASP LEU GLY PHE ASN VAL LEU LEU PRO ASP ASP ARG  
                     85                      90                      95  
 GLY HIS GLY GLU SER ASP GLY GLU TYR ILE SER PHE GLY TRP LEU ASP  
                     100                      105                      110  
 ARG LEU ASP TYR LEU GLY TRP LEU GLN ARG ILE LEU ASP ARG LEU GLY  
                     115                      120                      125  
 ASN ASP ALA GLN LEU LEU LEU PHE GLY THR SER MET GLY GLY ALA THR  
                     130                      135                      140  
 VAL SER LEU VAL ALA GLY GLU PRO SER LEU PRO LYS GLN VAL LYS ALA  
 145                      150                      155                      160  
 VAL ILE GLU ASP CYS GLY TYR THR ASP VAL GLU THR GLU LEU ALA TYR  
                     165                      170                      175  
 LEU LEU LYS LYS GLN PHE HIS LEU PRO PRO LEU PRO LEU VAL PRO LEU  
                     180                      185                      190  
 ALA SER PHE ILE ASN TYR ARG ARG LEU GLY TYR PRO LEU ARG VAL VAL  
                     195                      200                      205  
 ASN VAL ARG GLN ALA LEU THR ARG ASN ARG LEU PRO LEU LEU VAL ILE  
                     210                      215                      220  
 HIS GLY ALA GLU ASP VAL TYR VAL PRO THR LYS MET GLY ARG GLU ASN  
 225                      230                      235                      240  
 TYR ALA ALA SER ALA GLY PRO LYS ALA LEU TRP ILE VAL PRO GLY ALA  
                     245                      250                      255  
 ALA HIS ALA GLU SER TYR TRP ILE ASN PRO ALA ALA TYR GLN ALA HIS  
                     260                      265                      270  
 VAL LYS ARG PHE LEU ASP ILE PHE PHE  
                     275                      280

<210> 91  
 <211> 426  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 91  
 MET LYS ILE LEU THR GLY THR LEU THR GLU LEU GLN GLN GLN VAL THR

1                    5                    10                    15  
THR ARG GLN GLN THR VAL ALA GLN ASN PRO ALA VAL GLN THR THR VAL  
                  20                    25                    30  
GLN LYS ILE LEU ALA ASP VAL LYS LEU ASN GLY ASP LYS ALA LEU LEU  
                  35                    40                    45  
ALA TYR ASN ALA THR PHE ASP ASP VAL ALA ILE SER ASP LEU ARG VAL  
                  50                    55                    60  
PRO GLN ALA GLN ILE ASN ALA ALA MET ALA ASP LEU SER PRO LYS LEU  
65                    70                    75                    80  
LEU ALA ALA LEU THR LEU ALA LYS LYS ASN ILE THR SER SER HIS GLN  
                  85                    90                    95  
LEU GLU MET SER GLN GLY PHE ILE ASP SER PRO TYR PRO GLY VAL ILE  
                  100                    105                    110  
ARG GLY GLN LYS LEU THR PRO LEU ALA ALA VAL GLY LEU TYR VAL PRO  
                  115                    120                    125  
GLY GLY THR ALA ALA TYR PRO SER THR ILE LEU MET THR ALA ILE PRO  
                  130                    135                    140  
ALA LYS LEU ALA GLY VAL LYS LYS ILE VAL MET VAL THR PRO PRO GLN  
145                    150                    155                    160  
ALA LYS GLY LEU ASN PRO ALA VAL LEU ALA ALA ALA LYS LEU ALA GLY  
                  165                    170                    175  
VAL ASP GLU ILE TYR GLN VAL GLY GLY ALA GLN ALA ILE GLY ALA LEU  
                  180                    185                    190  
THR TYR GLY THR GLU SER ILE PRO LYS VAL ASP LYS ILE LEU GLY PRO  
                  195                    200                    205  
GLY ASN ARG TYR VAL ALA GLU ALA LYS LYS GLN VAL PHE GLY ASP VAL  
                  210                    215                    220  
ALA ILE ASP MET ILE ALA GLY PRO SER GLU ILE GLY ILE ILE ALA ASP  
225                    230                    235                    240  
ASP SER ALA ASP PRO VAL ARG VAL ALA ALA ASP LEU LEU SER GLN ALA  
                  245                    250                    255  
GLU HIS ASP PRO ASN ALA ARG ALA MET LEU VAL THR THR SER PRO ALA  
                  260                    265                    270  
LEU ALA ASP ALA VAL SER LYS ALA VAL ASP SER GLN LEU LEU SER LEU  
                  275                    280                    285  
PRO ARG LYS ALA ILE ALA GLN ALA ALA ILE THR ASN GLN GLY PHE ILE  
                  290                    295                    300  
  
ALA ILE VAL PRO ASP VAL ALA SER ALA PHE CYS LEU MET ASN THR ILE  
305                    310                    315                    320  
ALA PRO GLU HIS LEU GLU ILE GLN LEU PRO ASN PRO ILE THR TYR LEU  
                  325                    330                    335  
  
ASN GLU ILE HIS ASN ALA GLY SER VAL PHE LEU GLY GLU ASN ALA ALA  
                  340                    345                    350  
GLU PRO VAL GLY ASP TYR VAL ALA GLY PRO ASN HIS VAL LEU PRO THR  
                  355                    360                    365  
ALA GLY SER ALA ARG PHE PHE SER PRO LEU GLY VAL TYR ASP PHE VAL  
                  370                    375                    380  
LYS ARG THR GLN PHE ILE GLN TYR SER ALA ALA ALA LEU ALA THR GLN  
385                    390                    395                    400  
ALA ASP ALA ILE VAL THR LEU ALA GLN THR GLU GLY LEU ASP GLY HIS  
                  405                    410                    415  
ALA GLU ALA ILE LEU LYS ARG ILE THR ARG  
                  420                    425

<210> 92



<211> 382  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 92

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MET SER ASN ARG HIS LEU PRO VAL GLY THR ARG ASP GLU PHE GLY PRO
 1           5           10           15
ARG ALA ILE ARG LYS GLU ASN LEU ILE GLN MET MET SER HIS ARG PHE
 20           25           30
ILE ALA SER GLY TYR GLU ARG VAL LYS THR PRO LEU LEU GLU TYR ARG
 35           40           45
ASP VAL PHE GLN PRO LEU THR VAL ARG GLY GLU GLN PRO TYR GLN MET
 50           55           60
LEU ASP ASP ALA GLY GLU ALA VAL VAL MET ARG PRO ASP LEU THR LEU
 65           70           75           80
PRO LEU ALA ARG LEU LEU SER THR THR SER ILE GLN PRO PRO VAL GLN
 85           90           95
TRP TRP TYR VAL GLY ASP VAL PHE ARG VAL ARG LYS SER LEU SER GLY
 100          105          110
THR TYR ASN GLN MET THR GLN ALA GLY ILE GLU LEU ILE GLY TYR ALA
 115          120          125
SER ILE LYS ALA GLU TRP ALA CYS LEU SER GLU ALA THR ARG ILE CYS
 130          135          140
GLU ASP LEU GLY LEU THR ASP LEU THR LEU GLU LEU SER ASP VAL GLN
 145          150          155          160
PHE VAL SER GLN VAL MET GLN ALA LEU PRO LEU ASP PRO ALA THR ALA
 165          170          175
SER ALA LEU GLN ALA ALA PHE PHE LYS LYS ASN LEU SER THR TYR GLN
 180          185          190
GLN LEU ILE ALA PRO LEU ARG ALA GLU PRO LEU TYR PRO PHE LEU GLN
 195          200          205
GLN TRP PRO TRP LEU PHE GLY GLU ALA ALA THR ILE PHE THR GLN LEU
 210          215          220
ALA GLN LEU LEU PRO PRO THR LEU LEU HIS SER ARG LEU LYS PRO LEU
 225          230          235          240
GLN GLN THR VAL ALA PHE LEU GLN HIS GLN PHE PRO GLN VAL THR ILE
 245          250          255
THR VAL ASP LEU THR SER GLN PRO PRO GLN SER TYR TYR THR GLY LEU
 260          265          270
PHE PHE HIS ALA TYR ALA SER ASP SER ARG GLN TYR LEU PHE SER GLY
 275          280          285
GLY ARG TYR ASP GLN LEU LEU ALA SER PHE GLN GLN ASP LEU LEU PRO
 290          295          300
ALA VAL GLY LEU ALA PHE ASP VAL ASP ALA LEU SER ASP ILE LEU PRO
 305          310          315          320
ASP ASP PRO LYS PRO ALA LEU THR LEU VAL TYR GLY ARG PRO SER GLN
 325          330          335
TRP GLN GLU ALA ALA ALA VAL VAL ALA THR THR PRO HIS ALA GLN LEU
 340          345          350
CYS LEU VAL ASP SER LEU ALA GLU ALA LYS THR MET ALA GLN LYS TYR
 355          360          365
HIS ALA LYS LEU ILE ASP LEU SER PRO LYS GLU ALA MET GLN
 370          375          380

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<210> 93  
 <211> 418  
 <212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 93

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MET ASP VAL THR THR ILE ASP LEU GLU GLN MET GLY ARG ALA ALA LYS
 1           5           10           15
ALA ALA ALA THR VAL LEU SER GLN LEU THR THR ALA GLN LYS ASN ALA
 20           25           30
GLY LEU LEU ALA MET VAL THR ALA LEU GLU THR HIS THR GLU THR ILE
 35           40           45
LEU GLY ALA ASN HIS GLU ASP LEU LYS ALA ALA ALA SER LEU PRO ALA
 50           55           60
LYS PHE THR ASP ARG LEU VAL LEU THR ALA GLU ARG ILE ALA ASP MET
 65           70           75           80
ALA ALA GLY VAL ARG GLN VAL ALA ALA LEU PRO ASP PRO THR ALA GLN
 85           90           95
THR ASP LYS ALA TRP VAL ASN HIS ALA GLY LEU ASN ILE ALA GLN LYS
100           105           110
ARG VAL PRO LEU GLY VAL VAL GLY MET ILE TYR GLU ALA ARG PRO ASN
115           120           125
VAL THR VAL ASP ALA ALA ALA LEU THR PHE LYS SER GLY ASN ALA VAL
130           135           140
ILE LEU ARG GLY GLY LYS GLU ALA LEU HIS SER ASN LEU ALA LEU ALA
145           150           155           160
THR VAL LEU GLN ALA ALA LEU THR ALA GLN GLY LEU PRO LYS ASP ALA
165           170           175
ILE GLN LEU ILE THR ASP PRO LYS ARG GLU VAL ALA ASN GLN MET MET
180           185           190
HIS LEU ASN GLY TYR ILE ASP VAL LEU ILE PRO ARG GLY GLY ARG GLY
195           200           205
LEU ILE LYS ALA VAL VAL GLU GLN ALA THR VAL PRO VAL ILE GLU THR
210           215           220
GLY ALA GLY ASN CYS HIS ILE TYR VAL ASP ALA TYR ALA GLN ALA GLN
225           230           235           240
MET ALA ILE ASP ILE VAL VAL ASN ALA LYS VAL GLN ARG PRO SER VAL
245           250           255
CYS ASN ALA ALA GLU LYS LEU LEU ILE HIS ALA ASP VAL ALA ASN ALA
260           265           270
GLN LEU PRO LEU ILE ALA ALA ALA LEU GLN ALA HIS GLY VAL GLU LEU
275           280           285
ARG GLY ASP GLU ARG ALA ARG ALA ILE VAL PRO ASN MET GLN ILE ALA
290           295           300
THR GLU GLU ASP TRP ASP THR GLU TYR ASN ASP LEU ILE MET ALA VAL
305           310           315           320
LYS VAL VAL ASP SER GLU GLU GLU ALA ILE ALA HIS ILE ASN ALA HIS
325           330           335
ASN THR LYS HIS SER GLU ALA ILE ILE THR ASP ASN TYR GLN ASN SER
340           345           350
GLN GLN PHE LEU GLN GLN VAL ASP ALA ALA VAL VAL TYR VAL ASN ALA
355           360           365
SER THR ARG PHE THR ASP GLY PHE GLU PHE GLY PHE GLY ALA GLU ILE
370           375           380
GLY ILE SER THR GLN LYS LEU HIS ALA ARG GLY PRO MET GLY LEU ALA
385           390           395           400
ALA LEU THR THR ILE LYS TYR GLN VAL LEU GLY ASN GLY GLN VAL ARG
405           410           415
GLU GLY

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<210> 94  
 <211> 274  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 94  
 MET LEU HIS CYS LYS ARG LEU VAL VAL LYS ILE GLY THR SER SER LEU  
 1 5 10 15  
 ILE HIS GLN ASN GLY LYS VAL ASN LEU GLN THR ILE ASP ARG LEU ALA  
 20 25 30  
 TYR THR LEU ALA ALA LEU THR ASN GLN GLY TYR GLU LEU VAL LEU VAL  
 35 40 45  
 THR SER GLY ALA ILE GLY VAL GLY MET ALA LYS LEU GLY VAL THR VAL  
 50 55 60  
 ARG PRO ALA GLU ILE ALA GLN GLN GLN ALA LEU ALA ALA ILE GLY GLN  
 65 70 75 80  
 SER GLU LEU MET THR LEU TYR THR GLN ARG PHE SER ASP TYR GLY ALA  
 85 90 95  
 LYS ILE GLY GLN LEU LEU LEU THR HIS ASP VAL PHE ASP TYR PRO GLN  
 100 105 110  
 THR ARG GLN HIS VAL LEU ASP THR ILE ASP ALA LEU LEU LYS ARG GLN  
 115 120 125  
 VAL MET PRO ILE ILE ASN GLU ASN ASP SER VAL ALA VAL ASP GLU LEU  
 130 135 140  
 ASP HIS ARG THR THR PHE GLY ASP ASN ASP GLN LEU SER ALA LEU VAL  
 145 150 155 160  
 ALA LYS GLN ILE GLY ALA ASP LEU LEU VAL VAL LEU SER ASP ILE ASP  
 165 170 175  
 GLY LEU TYR ASP ARG ASP PRO ASN ARG HIS ALA ASN ALA ALA LEU ILE  
 180 185 190  
 PRO ALA ILE THR HIS VAL SER ALA LYS VAL LEU ALA GLY ALA GLY GLY  
 195 200 205  
 SER SER THR ARG PHE GLY THR GLY GLY MET VAL THR LYS LEU LYS ALA  
 210 215 220  
 ALA GLN VAL MET MET ARG ALA GLY LYS HIS MET VAL LEU THR SER GLY  
 225 230 235 240  
 ARG ASP PRO ARG ILE ILE LEU ARG VAL VAL ALA GLY GLU SER VAL GLY  
 245 250 255  
 THR TRP PHE GLY THR GLU LEU GLU PRO VAL PRO SER GLU VAL HIS ALA  
 260 265 270  
 ALA ASN

<210> 95  
 <211> 332  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 95  
 MET MET MET LYS LYS ILE LEU MET TYR SER VAL ARG PRO ASP GLU GLN  
 1 5 10 15  
 PRO ALA ILE ASP ASP TRP VAL ALA ALA ASN ASP LEU GLN VAL ASP THR  
 20 25 30  
 ASN THR VAL ALA PHE ASN ALA ASP THR VAL ASP LEU ALA LYS GLY TYR  
 35 40 45  
 ASP GLY VAL VAL ILE GLN GLN HIS GLY ALA ILE PRO GLU PRO LEU VAL

50                      55                      60  
 TYR GLN LYS LEU LYS SER PHE GLY MET LYS GLN LEU THR LEU ARG ILE  
 65                      70                      75                      80  
 THR GLY TYR ASP ILE VAL ASN LEU ASP ALA ALA THR ALA ASN GLY LEU  
                     85                      90                      95  
 ALA VAL THR ASN VAL PRO ALA TYR SER PRO ARG SER VAL ALA GLU LEU  
                     100                      105                      110  
 VAL LEU ALA HIS ALA MET ARG LEU ILE ARG HIS LEU GLY GLU ALA THR  
                     115                      120                      125  
 ALA ARG GLU ALA LYS ASP ASP TYR SER TRP GLY GLY LEU GLU ALA GLN  
                     130                      135                      140  
 GLU VAL HIS GLN LEU THR ILE GLY ILE ILE GLY ALA GLY LYS ILE GLY  
 145                      150                      155                      160  
 SER THR VAL ALA ARG ILE PHE ARG ALA LEU GLY SER THR VAL ILE VAL  
                     165                      170                      175  
 ALA ASP PRO VAL THR ARG PRO GLU LEU ALA ASP THR VAL ARG TYR VAL  
                     180                      185                      190  
 ASP LEU ASP THR LEU LEU ALA THR ALA ASP ILE VAL THR VAL HIS THR  
                     195                      200                      205  
 PRO LEU ASP ASP ILE THR THR HIS MET LEU ASP ALA ALA ALA PHE LYS  
                     210                      215                      220  
 LYS MET LYS LYS THR ALA TYR LEU ILE ASN ALA ALA ARG GLY PRO ILE  
 225                      230                      235                      240  
 VAL ASP THR THR ALA LEU ILE GLU ALA LEU GLN ARG GLY GLU VAL ALA  
                     245                      250                      255  
 GLY ALA ALA LEU ASP THR ILE GLU GLY GLU ALA GLY ILE PHE GLY VAL  
                     260                      265                      270  
 ASP ARG SER GLN SER GLY VAL ASP ASN THR ASN LEU GLU THR LEU LYS  
                     275                      280                      285  
 ALA LEU PRO ASN VAL GLU ILE SER PRO HIS ILE GLY PHE TYR THR ASP  
                     290                      295                      300  
 ALA ALA VAL LYS ASN MET THR TYR ASN LEU LEU ASP ASP VAL LYS THR  
 305                      310                      315                      320  
 ILE LEU ARG ARG GLY ALA PHE THR ASP GLN VAL ASN  
                     325                      330

<210> 96

<211> 275

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 96

LEU THR GLU ALA PRO LEU LYS ILE GLY ILE LEU ASN VAL MET HIS ASP  
 1                      5                      10                      15  
 LYS ALA ASP THR LYS THR ARG LEU GLN HIS VAL LEU SER HIS THR ASP  
                     20                      25                      30  
 ILE PRO VAL GLU LEU HIS PHE TYR TYR PRO MET THR HIS TYR ALA GLY  
                     35                      40                      45  
 ARG GLU VAL PRO GLU ALA VAL SER SER ILE LEU GLU PRO LEU ASP ILE  
                     50                      55                      60  
 HIS GLU ALA ALA THR MET ASP GLY PHE ILE ILE THR GLY SER PRO ILE  
 65                      70                      75                      80  
 GLU THR LEU GLU PHE ASP GLN VAL HIS TYR ILE ALA GLU VAL ARG THR  
                     85                      90                      95  
 LEU LEU LYS THR LEU GLY GLN HIS VAL PRO ASN GLN MET TYR LEU CYS  
                     100                      105                      110  
 TRP GLY GLY MET VAL ALA LEU ASN TYR PHE PHE GLY VAL SER LYS LEU

115 120 125  
 ILE LEU PRO HIS LYS LEU PHE GLY VAL TYR PRO GLN THR ILE LEU GLU  
 130 135 140  
 PRO HIS PRO PHE LEU LYS GLY LEU LYS GLU GLY PHE LYS SER PRO HIS  
 145 150 155 160  
 ALA ARG TYR ALA GLU MET ASP VAL ARG ASP ILE ARG ASP ASP PRO ARG  
 165 170 175  
 LEU THR ILE ASN ALA THR THR THR LYS GLY LYS LEU PHE MET VAL THR  
 180 185 190  
 GLU PRO THR ASP THR GLN THR PHE ILE PHE SER HIS ILE GLU TYR ASP  
 195 200 205  
 ARG TRP GLY LEU ASP SER GLU TYR LYS ARG GLU VAL ALA ALA HIS PRO  
 210 215 220  
 GLU ILE SER TYR LYS ARG ALA LYS HIS TYR TYR HIS HIS LYS ASN ASP  
 225 230 235 240  
 TYR ASP HIS PRO LYS PHE ASN TRP LYS LYS THR GLN ARG THR ILE PHE  
 245 250 255  
 ASP ASN TRP VAL ARG HIS ILE ALA ASP HIS ARG ASN GLU ASN ARG SER  
 260 265 270  
 PRO ILE ILE  
 275

<210> 97

<211> 730

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 97

MET VAL LYS TYR THR PRO LYS LEU GLY GLN ILE THR TYR TYR LYS ARG  
 1 5 10 15  
 PHE TYR THR ALA GLN VAL ASP GLU ARG ASP CYS GLY VAL ALA ALA LEU  
 20 25 30  
 ASN MET LEU LEU LYS TYR ASN GLY SER ASP TYR SER LEU ALA HIS LEU  
 35 40 45  
 ARG GLU LEU ALA LYS THR ASN GLN ASP GLY THR THR ALA LEU GLY ILE  
 50 55 60  
 VAL ARG ALA ALA GLU ALA LEU ALA PHE GLU THR LYS PRO VAL GLN ALA  
 65 70 75 80  
 ASN MET GLN LEU PHE ASP LEU GLU ASP VAL PRO TYR PRO PHE ILE ALA  
 85 90 95  
 HIS VAL LEU LYS ARG GLY GLU LEU LEU HIS TYR TYR VAL VAL PHE LYS  
 100 105 110  
 ALA THR ARG THR SER ILE LEU ILE GLY ASP PRO ASP PRO SER VAL ARG  
 115 120 125  
 MET THR TRP LEU SER ARG GLU VAL PHE GLU LYS GLU TRP SER GLY VAL  
 130 135 140  
 ALA ILE PHE ILE ALA PRO ALA PRO GLN TYR GLN PRO ARG LYS GLU ASP  
 145 150 155 160  
 LYS GLY SER LEU PHE ALA PHE VAL PRO MET LEU ALA LYS GLN LYS GLY  
 165 170 175  
 ILE ILE ALA ASN ILE ILE LEU ALA ALA VAL LEU ILE THR VAL ILE SER  
 180 185 190  
 ILE VAL GLY SER TYR PHE LEU GLN SER ILE ILE ASP THR TYR ILE PRO  
 195 200 205  
 ASN ALA MET ARG THR THR MET GLY MET ILE ALA SER GLY LEU LEU VAL  
 210 215 220  
 ALA TYR LEU LEU GLN ALA VAL LEU THR TYR GLY GLN ASN PHE LEU MET

225                    230                    235                    240  
ALA VAL LEU GLY GLN ARG LEU ALA ILE ASP VAL ILE LEU GLY TYR VAL  
                         245                    250                    255  
ARG HIS LEU TYR GLU LEU PRO MET SER PHE PHE SER THR ARG ARG THR  
                         260                    265                    270  
GLY GLU ILE VAL SER ARG PHE ALA ASP ALA ASN LYS ILE ILE ASP ALA  
                         275                    280                    285  
LEU ALA ASN THR ILE MET THR LEU PHE LEU ASP VAL TRP ILE VAL LEU  
                         290                    295                    300  
ILE LEU GLY ILE VAL LEU GLY ILE GLN ASN GLY THR LEU PHE LEU VAL  
305                    310                    315                    320  
SER LEU ILE ALA VAL PRO CYS TYR LEU VAL ILE VAL PHE ALA PHE GLN  
                         325                    330                    335  
ARG PRO PHE ASP ARG LEU ASN GLN GLU THR MET GLU SER ASN ALA ILE  
                         340                    345                    350  
LEU SER SER SER ILE ILE GLU ASP LEU ASN GLY ILE GLU THR ILE LYS  
                         355                    360                    365  
SER LEU THR GLY GLU ARG VAL SER TYR GLU ARG VAL ASP ARG GLU PHE  
370                    375                    380  
LEU THR TYR LEU LYS LYS SER PHE SER TYR THR LYS ALA ASP GLN LEU  
385                    390                    395                    400  
GLN GLN ALA ILE LYS GLY LEU LEU LYS LEU ALA LEU ASN VAL VAL VAL  
                         405                    410                    415  
LEU TRP ILE GLY ALA SER LEU VAL ILE ALA ASN ARG MET SER LEU GLY  
                         420                    425                    430  
GLN MET LEU THR PHE ASN ALA LEU LEU SER TYR PHE THR ASN PRO LEU  
435                    440                    445  
GLU SER ILE ILE ASN LEU GLN PRO LYS LEU GLN MET ALA ARG VAL ALA  
450                    455                    460  
ASN ASN ARG LEU ASN GLU VAL TYR LEU VAL GLU SER GLU PHE LYS GLU  
465                    470                    475                    480  
GLN ARG HIS LEU THR GLU ARG HIS LEU ILE GLU GLY PRO ILE ARG VAL  
                         485                    490                    495  
ARG ASP VAL SER PHE LYS TYR GLY PHE GLY GLN ASP VAL LEU LYS ASN  
500                    505                    510  
VAL ASN LEU GLU VAL PRO GLU ASN ALA LYS TYR THR ILE VAL GLY MET  
515                    520                    525  
SER GLY SER GLY LYS SER THR LEU ALA LYS LEU LEU VAL GLY PHE TYR  
530                    535                    540  
PRO VAL ASP ALA ASP LYS GLY THR ILE THR PHE ASN GLY ILE PRO VAL  
545                    550                    555                    560  
LYS ASP ILE ASN LEU THR THR LEU ARG GLN TYR ILE GLU TYR VAL PRO  
                         565                    570                    575  
GLN ASP PRO PHE ILE PHE SER GLY THR VAL LEU GLU ASN LEU THR LEU  
                         580                    585                    590  
GLY SER ARG SER ASP VAL SER GLU GLN ASP LEU THR GLN ALA CYS LEU  
595                    600                    605  
ALA ALA GLU ILE ALA ALA ASP ILE ALA ASN LEU PRO GLN GLN TRP GLN  
610                    615                    620  
THR LYS LEU SER GLU SER GLY SER ILE LEU SER GLY GLY GLN LYS GLN  
625                    630                    635                    640  
ARG LEU ALA ILE ALA ARG ALA LEU LEU SER PRO ALA LYS VAL LEU ILE  
                         645                    650                    655  
PHE ASP GLU SER THR SER SER LEU ASP THR ILE THR GLU ARG LYS ILE  
                         660                    665                    670  
VAL ASP ARG LEU LEU ALA MET THR ASP ARG THR ILE ILE PHE VAL ALA  
675                    680                    685

HIS ARG LEU THR ILE ALA ALA LYS THR GLU GLN ILE VAL VAL MET ASP  
690 695 700  
HIS GLY LYS ILE VAL GLU GLN GLY ASP HIS ALA THR LEU LEU ALA GLN  
705 710 715 720  
ASP GLY TYR TYR ALA ARG LEU VAL HIS GLU  
725 730

<210> 98  
<211> 381  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 98  
MET ALA GLY ALA TYR ILE HIS ILE PRO PHE CYS GLU HIS ILE CYS TYR  
1 5 10 15  
TYR CYS ASP PHE ASN LYS VAL PHE ILE GLU GLY GLN PRO VAL ASP ASP  
20 25 30  
TYR VAL ALA MET LEU LEU LYS GLU MET ARG MET VAL MET ALA GLU HIS  
35 40 45  
PRO GLU GLU LYS ILE GLU THR VAL TYR VAL GLY GLY GLY THR PRO THR  
50 55 60  
THR LEU THR PRO GLN GLN LEU ALA VAL LEU CYS GLN GLY ILE ARG ASP  
65 70 75 80  
ILE LEU HIS PHE ASP HIS GLY GLU PHE THR PHE GLU ALA ASN PRO ASN  
85 90 95  
ASP LEU LEU THR THR ASP LYS LEU GLN VAL LEU TYR ASP PHE GLY VAL  
100 105 110  
ASN ARG LEU SER ILE GLY VAL GLN SER PHE ASN ASP ASP VAL LEU LYS  
115 120 125  
ARG ILE GLY ARG ILE HIS ARG ALA LYS ASP VAL TYR THR ALA ILE GLY  
130 135 140  
ASN ALA ARG LYS VAL GLY PHE ASP ASN LEU SER ILE ASP LEU ILE PHE  
145 150 155 160  
ARG LEU PRO ASP GLN SER ARG ASP ASP PHE LEU ASN SER LEU GLN LYS  
165 170 175  
ALA LEU ALA LEU ASP LEU PRO HIS TYR SER THR TYR SER LEU ILE LEU  
180 185 190  
GLU ARG LYS THR ILE PHE TYR ASN LEU MET ARG GLN ARG LYS LEU ARG  
195 200 205  
LEU PRO THR GLN ASP VAL GLU ALA ASP MET TYR GLN ASP ALA ILE ASP  
210 215 220  
LEU MET GLU ALA HIS GLY ARG HIS GLN TYR GLU ILE SER ASN PHE ALA  
225 230 235 240  
LYS THR GLY TYR GLN CYS ARG HIS ASN LEU LEU TYR TRP GLN ASN ASP  
245 250 255  
LYS TYR PHE GLY PHE GLY ALA GLY ALA PHE GLY TYR LEU GLY ARG ASP  
260 265 270  
ARG TYR HIS ASN TYR GLY PRO ILE LYS GLN TYR LEU ALA PRO LEU HIS  
275 280 285  
ALA ASP HIS LEU PRO VAL LEU ALA HIS HIS LEU VAL PRO VAL SER GLU  
290 295 300  
GLN ILE GLU GLU GLU MET PHE LEU GLY LEU ARG THR MET ALA GLY VAL  
305 310 315 320  
ASN GLU ASP ARG PHE TYR SER ARG TYR HIS MET THR VAL ASP ALA VAL  
325 330 335  
TYR GLY GLU THR VAL PRO GLU LEU GLU SER GLN GLY LEU ILE GLU ARG  
340 345 350

GLN ASN GLY TYR ILE ARG LEU THR ASN ARG GLY LYS PHE LEU GLY ASN  
 355 360 365  
 GLU VAL PHE GLN GLN PHE LEU LEU ASP GLU PRO LEU VAL  
 370 375 380

<210> 99

<211> 333

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 99

MET THR VAL THR LEU THR ALA GLY GLN PHE LYS HIS LEU GLN LYS LEU  
 1 5 10 15  
 SER ASP GLU ASN ASN VAL ILE SER ALA LEU ALA ILE ASP GLN ARG GLY  
 20 25 30  
 SER LEU LYS LYS MET LEU ALA ALA ALA ALA ASN LYS PRO ALA ASP GLU  
 35 40 45  
 THR THR ILE VAL ASP PHE LYS LYS ALA VAL SER GLU GLU LEU THR LYS  
 50 55 60

TYR ALA SER SER ILE LEU LEU ASP PRO GLU TYR GLY LEU PRO ALA ALA  
 65 70 75 80  
 LYS VAL ARG ALA PRO GLN ALA GLY LEU LEU LEU SER TYR GLU LYS THR  
 85 90 95  
 GLY TYR ASP ALA THR GLU PRO GLY ARG PHE PRO ASP LEU ILE ASP ASN  
 100 105 110  
 GLN SER ALA LEU ARG ILE LYS ASN GLU GLY GLY ASP ALA VAL LYS PHE  
 115 120 125  
 LEU LEU TYR ILE ASP PRO ASP GLU PRO ASP SER ILE ASN ASP ARG LYS  
 130 135 140  
 TYR ALA PHE VAL GLU ARG VAL GLY ALA GLU ALA LYS ALA ASN ASP LEU  
 145 150 155 160  
 PRO LEU PHE LEU GLU LEU VAL SER TYR ASP GLY LYS THR ASN GLU THR  
 165 170 175  
 GLY THR ALA ALA TRP ALA LYS ALA LYS PRO GLU LYS VAL ILE LYS ILE  
 180 185 190  
 THR LYS GLU PHE SER LYS PRO GLN TYR ASN VAL SER VAL LEU LYS VAL  
 195 200 205  
 GLU VAL PRO VAL ASP GLN LYS PHE VAL GLU GLY PHE THR ASP GLU GLY  
 210 215 220  
 VAL THR PRO VAL TYR THR LYS GLU GLU ALA ALA LYS TYR TYR LYS ALA  
 225 230 235 240  
 GLN SER ASP ALA THR ASP LEU PRO PHE ILE PHE LEU SER ALA GLY VAL  
 245 250 255  
 SER ASN GLU LEU PHE LEU GLU GLU LEU LYS PHE ALA LYS GLU ALA GLY  
 260 265 270  
 SER THR PHE ASN GLY VAL LEU CYS GLY ARG ALA THR TRP LYS PRO GLY  
 275 280 285  
 VAL LYS PRO PHE ALA ALA GLU GLY GLU ALA ALA GLY LYS GLN TRP LEU  
 290 295 300  
 GLU THR GLU GLY LYS ALA ASN ILE ASP ARG LEU ASN LYS VAL LEU ALA  
 305 310 315 320  
 ASP THR ALA THR PRO TRP THR ASP LYS VAL GLU HIS ALA  
 325 330

<210> 100

<211> 634



<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 100

MET CYS GLY ILE ILE ALA PHE ALA ASP LYS THR ILE LEU ASN LYS LYS  
1 5 10 15  
PRO VAL ILE ASN ASN MET MET ASP MET ILE LYS HIS ARG GLY PRO ASN  
20 25 30  
SER SER GLY GLU TYR ILE ASN ASP ASP VAL ALA LEU GLY PHE ARG ARG  
35 40 45  
LEU SER ILE ILE ASP LEU LYS GLY GLY SER GLN PRO ILE LEU ASN GLU  
50 55 60  
ASP GLY THR VAL ALA ILE ILE PHE ASN GLY GLU ILE TYR ASN PHE GLN  
65 70 75 80  
SER ILE ARG LYS ASP LEU ILE ALA ALA GLY HIS VAL PHE LYS THR HIS  
85 90 95  
SER ASP THR GLU VAL LEU LEU HIS GLY TYR GLU GLU TYR GLY ILE GLU  
100 105 110  
GLU LEU LEU LYS LYS ILE ARG GLY MET PHE ALA PHE LEU ILE TRP ASP  
115 120 125  
ASP ASN LYS LYS GLU MET PHE GLY ALA ARG ASP PHE PHE GLY ILE LYS  
130 135 140  
PRO MET TYR TYR TYR HIS ASP GLY ASP THR PHE ILE VAL GLY SER GLU  
145 150 155 160  
ILE LYS ALA PHE LEU LYS HIS PRO LYS PHE LYS LYS GLN LEU ASN LYS  
165 170 175  
GLU ALA LEU LYS PRO TYR LEU THR PHE GLN TYR SER ALA LEU ASP GLU  
180 185 190  
THR PHE PHE LYS GLY VAL TYR ARG ILE PRO GLU GLY HIS TYR PHE THR  
195 200 205  
LEU LYS ASP ASN GLU LEU THR ILE LYS LYS TYR TRP ASP MET ASP PHE  
210 215 220  
LYS ALA ASN ASN LEU SER PHE GLU ASP THR VAL ALA ALA ILE ASP LYS  
225 230 235 240  
SER VAL SER GLU SER VAL ASP ALA HIS ARG ILE SER ASP VAL GLU VAL  
245 250 255  
GLY SER LEU LEU SER SER GLY VAL ASP SER SER TYR ILE THR ALA LEU  
260 265 270  
LEU ARG PRO GLU HIS THR PHE SER ILE GLY PHE ASP ASN LYS LYS TYR  
275 280 285  
HIS GLU GLY VAL ALA ALA LYS GLU LEU SER ASP LYS LEU GLY LEU ASP  
290 295 300  
ASN THR SER ASP ILE VAL THR GLU LYS GLU ALA LEU ASP ASN PHE PRO  
305 310 315 320  
LEU ILE GLN TYR HIS LEU ASP GLU PRO ASP SER ASN PRO SER CYS VAL  
325 330 335  
PRO LEU TYR PHE LEU THR ARG LEU ALA HIS LYS ASP VAL THR VAL ILE  
340 345 350  
LEU SER GLY GLU GLY ALA ASP GLU LEU PHE ALA GLY TYR ALA ASN TYR  
355 360 365  
GLY PHE HIS THR ARG SER HIS ALA ILE ARG VAL PHE ALA ASP GLY LEU  
370 375 380  
ARG LYS LEU PRO ARG GLY VAL LYS TYR ARG ILE ALA HIS GLY LEU LYS  
385 390 395 400  
LYS MET PRO ASN PHE HIS GLY ARG LEU HIS LEU TYR GLU SER THR ALA  
405 410 415  
PRO ALA GLU GLU PHE PHE ILE GLY GLU ALA LEU VAL PHE HIS GLU GLY

420 425 430  
 GLN ALA ASP GLU ILE LEU GLN PRO GLU PHE ARG GLN SER LYS SER VAL  
 435 440 445  
 ARG ASP ILE VAL THR GLU SER TYR LYS LYS VAL ARG HIS TYR ASP ASP  
 450 455 460  
 GLU VAL LYS LYS MET GLN TYR LEU ASP ILE HIS GLN PHE MET PRO LYS  
 465 470 475 480  
 ASP ILE LEU LEU LYS ALA ASP LYS LEU SER MET ALA ASN SER MET GLU  
 485 490 495  
 LEU ARG VAL PRO PHE LEU ASP LYS GLU VAL ALA LYS VAL ALA ALA GLY  
 500 505 510  
 ILE PRO THR LYS TYR LEU ILE ASN SER HIS ASN SER LYS TYR ALA LEU  
 515 520 525  
 ARG GLU ALA ALA ASN ARG HIS LEU PRO GLU GLU TRP ALA SER ARG GLU  
 530 535 540  
 LYS LEU GLY PHE PRO VAL PRO VAL LYS GLN TRP LEU GLU ASP GLU PRO  
 545 550 555 560  
 PHE TYR LYS LYS VAL ARG GLU THR PHE GLU GLN ASP TRP VAL LYS GLU  
 565 570 575  
 PHE PHE ASP GLN ASP ALA ILE LEU ASP ILE LEU ASP LYS THR TYR ARG  
 580 585 590  
 LYS GLU ARG ASN ASP ARG ARG LYS VAL TRP THR ILE TYR THR PHE LEU  
 595 600 605  
 VAL TRP TYR LYS VAL TYR PHE ILE ASP ASP GLU ILE PRO HIS TYR VAL  
 610 615 620  
 ALA ASP SER ASN LYS GLU LYS LEU GLU ALA  
 625 630

<210> 101

<211> 347

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 101

MET GLN ALA VAL LEU GLU ASN GLY PRO LYS GLN ILE GLU ILE LYS SER  
 1 5 10 15  
 PHE PRO ASP PRO VAL ILE GLN GLY ASP GLU ILE LEU MET LYS ILE ARG  
 20 25 30  
 ALA ASN GLY LEU CYS GLN ASN ASP VAL ARG ASP TYR THR GLY ASP THR  
 35 40 45  
 LYS TRP THR TYR PRO ARG VAL GLY GLY HIS GLU PHE SER GLY GLU ILE  
 50 55 60  
 ILE ALA VAL GLY ASN ALA VAL ASN PRO LYS HIS PHE GLN VAL GLY ASP  
 65 70 75 80  
 HIS VAL VAL LYS TYR ILE LEU PRO ASN CYS GLY GLU CYS TYR TYR CYS  
 85 90 95  
 LYS THR GLY ARG PRO ASN LEU CYS THR GLU ILE TYR SER SER PRO THR  
 100 105 110  
 PHE HIS ASN ASP TYR GLY ILE SER GLY PHE TRP GLY MET SER GLN LEU  
 115 120 125  
 MET ALA VAL LYS THR THR ASP LEU PHE LYS TYR PRO HIS THR THR SER  
 130 135 140  
 PHE LEU ASP MET ALA PHE THR GLU PRO LEU GLY CYS VAL ILE ASN SER  
 145 150 155 160  
 VAL GLU ARG ALA ASN VAL GLN LEU GLY GLN ASP ALA LEU VAL ILE GLY  
 165 170 175  
 GLY GLY VAL MET GLY LEU LEU HIS VAL MET THR LEU LYS LEU LYS GLY

180                      185                      190  
 ALA ARG VAL LEU VAL SER GLU PRO ASN GLU ASN ARG ARG ARG LEU ALA  
 195                      200                      205  
 LEU GLU LEU GLY ALA ASP PHE VAL PHE ASP PRO MET GLN LYS ASP PRO  
 210                      215                      220  
 VAL ALA LEU VAL LYS ASN GLU THR ASP GLY ARG GLY ALA ASP VAL VAL  
 225                      230                      235                      240  
 PHE ASN THR THR ALA VAL PRO ALA ILE ALA LYS GLN ALA ILE ALA PHE  
 245                      250                      255  
 THR ALA ASN GLY GLY GLN THR PHE MET PHE SER SER MET HIS PRO ASP  
 260                      265                      270  
 ASP PRO VAL SER ILE ASP LEU GLY ALA VAL HIS ALA HIS GLU LYS PHE  
 275                      280                      285  
 ILE LYS GLY THR VAL SER PRO THR ARG GLU THR TYR PHE ARG ALA THR  
 290                      295                      300  
 GLN LEU ILE SER LYS LYS ALA LEU ASN LEU ARG PRO LEU LEU ASP LYS  
 305                      310                      315                      320  
 THR PHE PRO TYR THR ASP ALA GLU SER ALA PHE GLN TYR ALA MET LEU  
 325                      330                      335  
 PRO GLU THR LEU LYS THR MET VAL THR PHE ASP  
 340                      345

<210> 102

<211> 183

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 102

MET LEU VAL VAL SER SER TYR TRP SER GLN ARG GLN ALA GLU VAL SER  
 1                      5                      10                      15  
 GLN ARG GLN ALA ILE VAL ASP LYS LYS ALA ALA GLU LYS ALA LYS LYS  
 20                      25                      30  
 GLU ALA PHE ILE LYS ARG LEU VAL PRO THR ALA GLN ALA MET GLN LYS  
 35                      40                      45  
 GLN TYR GLY VAL LEU THR SER ILE THR LEU ALA GLN ALA ILE LEU GLU  
 50                      55                      60  
 SER ASP TRP GLY THR SER THR LEU ALA LYS ASP TYR HIS ASN LEU PHE  
 65                      70                      75                      80  
 GLY ILE LYS GLY THR ASP PRO ALA THR THR LYS VAL LEU ARG THR LYS  
 85                      90                      95  
 GLU TYR VAL ASN ASP LYS TRP ILE THR VAL ASP GLY ARG PHE ARG VAL  
 100                      105                      110  
 TYR SER ASP ASP ALA ALA SER ILE ARG ASP HIS ALA LEU LEU PHE VAL  
 115                      120                      125  
 ASN GLY THR ASP TRP ASN PRO GLN GLN TYR ALA THR VAL ARG ALA ALA  
 130                      135                      140  
 LYS ASP TYR LYS THR ALA ALA SER ALA LEU GLN THR ASP GLY TYR ALA  
 145                      150                      155                      160  
 THR ASP PRO ASP TYR PRO GLN LYS LEU ILE HIS LEU ILE GLU ALA TRP  
 165                      170                      175  
 ASN LEU THR GLN TYR ASP ASN  
 180

<210> 103

<211> 1222

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 103

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MET VAL ASP TYR VAL ASN PRO GLY LEU ASN GLU HIS LYS PRO ASP LEU
 1           5           10           15
ALA TRP ALA LYS GLU TYR ALA LYS ARG VAL LYS THR ASP ASN THR GLY
 20           25           30
PHE LYS ASN ASP THR GLU ARG GLN LEU TYR ASN LYS ILE LYS VAL VAL
 35           40           45
ILE SER ASP GLU VAL GLY VAL GLY SER PHE GLY LYS ASP MET VAL THR
 50           55           60
ASP SER SER LEU ARG ASN ALA ILE THR ALA ALA GLY TYR HIS TYR SER
 65           70           75           80
THR GLU ASP ASP SER ALA LYS ASN PHE THR ALA LEU ALA ASP LYS TYR
 85           90           95
ASP LYS GLU VAL TRP ASN SER GLU ALA GLN ALA THR PHE GLY ASN SER
 100          105          110
ASP TYR TRP PRO ASN SER GLY THR GLY ILE GLY GLY ALA GLY SER SER
 115          120          125
LEU GLU MET ALA ASN THR ILE VAL LYS GLY PHE THR ASP SER ARG ARG
 130          135          140
THR ASN PHE ILE TYR GLN PRO ALA ILE ALA ALA PHE TYR GLU GLY GLY
 145          150          155          160
GLN TYR SER SER LYS SER VAL LEU GLN ALA THR ASP PRO TRP SER GLY
 165          170          175
TRP THR ASN SER ASP VAL ALA ILE ASP VAL LEU ALA GLN PHE SER LYS
 180          185          190
PHE ALA LYS LEU GLY TRP GLU ASN SER ASP ASN THR SER GLY ILE TRP
 195          200          205
ARG ALA VAL SER GLN ALA SER VAL SER THR ALA THR GLY SER ASN ASN
 210          215          220
VAL ASN GLY ARG ASN GLY LEU ALA ASN TYR LEU THR LEU ALA SER PRO
 225          230          235          240
ASP LYS LYS ASP PHE SER THR VAL ILE VAL ASN ASP SER LYS TYR THR
 245          250          255
LYS HIS TYR GLN ILE SER ALA SER ASN MET ALA TYR LYS GLY THR PRO
 260          265          270
THR LEU GLU GLU TRP GLU THR ARG ALA ALA ASP THR THR ALA LYS ASP
 275          280          285
ALA TYR ASP SER ASN TYR LEU LYS HIS VAL GLY ASP VAL GLN ALA ASP
 290          295          300
SER LYS GLY VAL TYR THR VAL THR VAL LYS PRO PHE SER ILE LYS THR
 305          310          315          320
VAL THR THR LEU ASP LYS ALA LYS ASP SER ASP LEU ASN GLN GLY ILE
 325          330          335
SER ALA SER SER ASN LYS GLN ARG THR VAL LEU ASP THR ASP THR ASN
 340          345          350
GLY LYS GLY THR ASP THR SER ASP THR THR LEU TYR ALA ASP ASN PHE
 355          360          365
GLU TYR GLY GLY LYS LYS VAL ALA THR LEU ASN ALA ASP GLY THR SER
 370          375          380
ASN ALA ALA LYS THR GLU ASP PHE ILE THR SER ARG GLY GLY ASP GLU
 385          390          395          400
GLY PHE TYR PRO LEU TYR THR PHE ASN ARG ASN GLY THR LEU GLU GLY
 405          410          415
TYR LYS THR THR ASN ALA LYS SER GLY HIS TYR VAL LEU ARG GLN GLN
 420          425          430

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LEU ASP SER THR VAL VAL GLU PRO GLY GLY ALA TRP ASN ASP GLY ASP  
 435 440 445  
 ALA LEU ALA TRP ILE GLY ASP ASN ARG TRP MET ASN TYR LYS ALA SER  
 450 455 460  
 THR ASP VAL SER PHE GLU ASP LYS GLY THR HIS GLY SER ALA ASN TYR  
 465 470 475 480  
 ALA SER ILE GLY ALA ARG GLN GLN ALA ASP SER GLY PRO ALA ALA TYR  
 485 490 495  
 LEU LYS PHE TRP GLN ASP GLY GLY TRP SER LEU HIS ILE GLY SER GLN  
 500 505 510  
 SER VAL ALA SER GLY ASN ILE ALA THR GLY GLN GLY GLY THR LYS ILE  
 515 520 525  
 SER GLY PHE ASP THR THR ASN THR ALA TRP HIS ASN ILE ALA ILE GLN  
 530 535 540  
 ALA ALA GLY ASN THR ILE THR ALA SER ILE ASP GLY GLN LYS VAL ALA  
 545 550 555 560  
 ASP GLY LYS VAL THR SER GLU LEU SER GLY ARG VAL THR LEU GLY SER  
 565 570 575  
 GLY TYR PHE HIS THR ASP PHE ASP ASN LEU LYS VAL GLU THR VAL LYS  
 580 585 590  
 GLY TYR THR PRO TYR TYR SER GLN GLN ILE ASP ASP LEU GLU MET TYR  
 595 600 605  
 ASP THR SER ALA THR PRO LYS GLN GLN LEU VAL TYR ASN ASP GLN TRP  
 610 615 620  
 THR HIS GLU THR GLY GLN GLY MET TYR LEU ARG ASP ARG THR VAL SER  
 625 630 635 640  
 LYS ASN THR GLY ALA GLY ALA THR LEU THR TYR THR PHE THR GLY THR  
 645 650 655  
 GLY LEU ASP ILE CYS GLY ASN ASN ASP GLY SER ALA LYS LEU ASP VAL  
 660 665 670  
 THR VAL ASP GLY LYS GLN VAL ALA THR ASP ALA ALA THR ASN LYS ALA  
 675 680 685  
 ASP ASN LEU GLY GLN THR TYR THR LEU ARG ASN LEU LYS TYR GLY GLN  
 690 695 700  
 HIS THR VAL THR PHE THR VAL LYS SER GLY THR LEU ALA VAL ASP TYR  
 705 710 715 720  
 VAL GLY VAL VAL PRO SER ASP THR ILE ALA ASP PHE SER LYS LEU GLN  
 725 730 735  
 THR ALA TYR ASP LYS VAL LYS ASP VAL THR ASN ALA ASP ASN LYS TYR  
 740 745 750  
 THR SER SER SER TRP THR SER PHE GLN LYS VAL LEU LEU ALA ALA LYS  
 755 760 765  
 ASN VAL LEU ALA ASP THR ALA SER GLN ASN ASP ILE ASP THR ALA  
 770 775 780  
 LEU LYS ASN LEU ASN THR ALA TYR ALA ALA LEU ALA LEU ASN PRO ASP  
 785 790 795 800  
 LYS THR LYS LEU GLN ALA ALA TYR ASP LYS ALA LYS ALA VAL THR ASN  
 805 810 815  
 PRO SER ASP LYS TYR THR ALA ALA SER TRP LYS VAL PHE GLN THR ALA  
 820 825 830  
 LEU THR ASP ALA GLN ASP VAL LEU ALA ASN ALA ASN ALA THR GLN ASN  
 835 840 845  
 ASP VAL ASP SER ALA LEU GLU ASN LEU ASN GLN ALA ALA SER ASP LEU  
 850 855 860  
 VAL LEU ASN PRO ALA LYS PRO ASP LYS THR LYS LEU GLN ALA ALA TYR  
 865 870 875 880  
 ASP LYS ASN LYS THR VAL THR ASN PRO ASP ASP LYS TYR THR SER GLU

885 890 895  
 SER TRP GLN ALA PHE GLN THR ALA LEU SER ASP ALA GLN LYS VAL LEU  
 900 905 910  
 THR ASP THR ASN ALA THR GLN ASP SER LEU ASP THR THR LEU GLN LYS  
 915 920 925  
 LEU ASN ASN ALA TYR ALA GLY LEU LYS LEU ASN SER GLN LYS PRO ASP  
 930 935 940  
 LYS SER ALA LEU GLN THR ALA TYR ASP LYS ASP SER THR VAL THR ASN  
 945 950 955 960  
 GLN ALA ASN LYS TYR THR THR ALA SER TRP THR THR PHE GLN SER ALA  
 965 970 975  
 LEU ALA ASN ALA LYS LYS VAL LEU ALA ASP THR ASP ALA VAL GLN ALA  
 980 985 990  
 ASP VAL ASP THR ALA LEU GLN LYS LEU ASN ASN ALA TYR ASP GLY LEU  
 995 1000 1005  
 THR LEU SER PRO ASP LYS SER ALA LEU GLN THR VAL LEU THR GLU ALA  
 1010 1015 1020  
 GLN THR LEU SER HIS SER ALA VAL THR GLY ASP HIS GLU GLY ASN TYR  
 1025 1030 1035 1040  
 PRO ALA ASP ALA LEU LYS THR LEU GLN VAL ALA ILE ASP THR ALA LYS  
 1045 1050 1055  
 LYS VAL ALA ASP ASN PRO ASP ALA SER LYS ASN ASP ILE ASP THR ALA  
 1060 1065 1070  
 ALA SER THR LEU LYS GLN ALA VAL THR ALA PHE LYS GLN THR ILE VAL  
 1075 1080 1085  
 THR VAL ASN ARG ASP GLN LEU THR GLN LEU VAL THR GLU SER GLN THR  
 1090 1095 1100  
 LEU ARG ALA ASP ASP TYR THR ARG ASN SER TRP THR PRO TYR GLN GLN  
 1105 1110 1115 1120  
 ALA VAL ALA ALA ALA GLN LYS LEU LEU ALA GLY LYS PRO SER GLN GLN  
 1125 1130 1135  
 GLU LEU ASP THR ALA ALA THR ALA LEU LYS LYS ALA LYS THR SER LEU  
 1140 1145 1150  
 VAL ALA ALA PRO THR GLY LYS LEU PRO SER THR GLY ASP ALA SER SER  
 1155 1160 1165  
 GLU SER ALA SER SER SER GLU GLU THR ALA SER SER SER THR ALA LYS  
 1170 1175 1180  
 TYR PRO SER THR GLY GLU SER GLN LEU SER LEU ALA VAL THR MET ALA  
 1185 1190 1195 1200  
 ALA VAL VAL PHE LEU ILE GLY ILE SER GLY PHE ALA TRP PHE LEU HIS  
 1205 1210 1215  
 GLN LYS GLY LYS ALA LYS  
 1220

<210> 104

<211> 874

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 104

MET ALA LYS GLY ARG LEU SER ARG PRO ARG ARG LEU THR LEU ARG LEU  
 1 5 10 15  
 LEU PRO ARG TRP VAL ALA LEU THR HIS LYS ARG ASN TRP CYS MET LEU  
 20 25 30  
 VAL ALA THR HIS PHE TYR GLN LEU PHE GLN PRO LYS HIS TYR ASP LEU  
 35 40 45  
 TYR LEU ASP ILE ASN ARG GLU THR LYS LYS ILE SER GLY LYS THR THR

50                      55                      60  
ILE THR GLY ASP ALA LYS GLN THR GLU ILE ALA VAL HIS GLN LYS TYR  
65                      70                      75                      80  
LEU THR VAL SER ALA VAL GLN ALA ASP GLY LYS ASP VAL PRO PHE THR  
                    85                      90                      95  
VAL ASP ASP PRO ALA GLU ALA VAL ARG ILE THR LEU PRO GLN ALA GLY  
                    100                      105                      110  
LYS VAL THR LEU THR LEU THR TYR THR ALA PRO LEU THR ASP THR MET  
                    115                      120                      125  
MET GLY ILE TYR PRO SER TYR TYR GLU VAL ASP GLY VAL LYS LYS GLN  
                    130                      135                      140  
ILE ILE GLY THR GLN PHE GLU THR THR ALA ALA ARG GLN ALA PHE PRO  
145                      150                      155                      160  
SER VAL ASP GLU PRO GLU ALA LYS ALA THR PHE ASP LEU ALA ILE LYS  
                    165                      170                      175  
PHE ASP GLU HIS PRO GLY GLU THR ILE ILE SER ASN MET PRO GLU VAL  
                    180                      185                      190  
ARG GLU GLU ASN GLY VAL HIS TYR PHE ASP THR THR VAL ARG MET SER  
                    195                      200                      205  
THR TYR LEU ILE ALA PHE ALA PHE GLY GLU LEU GLN ASN LYS GLN THR  
210                      215                      220  
THR THR LYS SER GLY VAL LYS ILE GLY VAL PHE ALA THR LYS ALA HIS  
225                      230                      235                      240  
GLN PRO ASN GLU LEU ASP PHE ALA LEU ASP ILE ALA LYS ARG SER ILE  
                    245                      250                      255  
GLU PHE TYR GLU ASP PHE TYR GLN THR PRO TYR PRO LEU PRO HIS SER  
                    260                      265                      270  
TRP GLN LEU ALA LEU PRO ASP PHE SER ALA GLY ALA MET GLU ASN TRP  
                    275                      280                      285  
GLY LEU VAL THR TYR ARG GLU ALA LEU LEU THR LEU ASP PRO ASP ASN  
290                      295                      300  
THR SER LEU GLU THR LYS GLN ARG VAL ALA THR VAL ILE ALA HIS GLU  
305                      310                      315                      320  
LEU ALA HIS GLN TRP PHE GLY ASP LEU VAL THR MET LYS TRP TRP ASP  
                    325                      330                      335  
ASP LEU TRP LEU ASN GLU SER PHE ALA ASN MET MET GLU TYR VAL ALA  
                    340                      345                      350  
VAL ASP ALA LEU GLN PRO ASP TRP HIS ILE TRP GLU THR PHE GLN THR  
355                      360                      365  
LEU GLU VAL PRO MET ALA LEU GLN ARG ASP ALA THR ASP GLY VAL GLN  
370                      375                      380  
SER VAL HIS VAL GLN VAL GLU ASP PRO ALA GLU ILE ASP SER LEU PHE  
385                      390                      395                      400  
ASP SER ALA ILE VAL TYR ALA LYS GLY ALA ARG MET LEU VAL MET VAL  
                    405                      410                      415  
ARG SER LEU ILE GLY ASP ASP ALA LEU ARG ALA GLY LEU LYS ALA TYR  
                    420                      425                      430  
PHE GLU ALA HIS HIS PHE GLY ASN ALA ALA GLY ALA ASP LEU TRP ALA  
                    435                      440                      445  
ALA LEU GLY LYS ALA ALA LYS LEU ASP VAL GLY THR ILE MET GLN SER  
450                      455                      460  
TRP LEU GLU GLN PRO GLY TYR PRO VAL VAL THR ALA ALA VAL VAL ASP  
465                      470                      475                      480  
GLY LYS LEU THR LEU SER GLN GLN GLN PHE PHE ILE GLY ALA GLY LYS  
                    485                      490                      495  
ASP ALA GLY ARG GLN TRP GLN ILE PRO LEU ASN SER ASN TYR ALA ALA  
                    500                      505                      510

ALA PRO GLN ILE PHE ALA ASP LYS GLN VAL THR LEU GLY ASP TYR THR  
 515 520 525  
 GLN LEU ARG GLU ALA SER GLY GLN PRO PHE ARG VAL ASN VAL GLY ASN  
 530 535 540  
 ASN SER HIS PHE ILE VAL LYS TYR ASP ALA THR LEU LEU ALA ASP ILE  
 545 550 555 560  
 LEU ALA HIS LEU ASP GLN LEU ASN ALA ILE ASP GLN ARG GLN VAL LEU  
 565 570 575  
 GLN ASP LEU ARG LEU LEU ALA GLU GLY ARG GLN ASN ALA TYR ALA ASP  
 580 585 590  
 ILE VAL SER LEU LEU PRO ARG PHE ALA GLN SER HIS SER ALA ILE VAL  
 595 600 605  
 ILE ASN ALA LEU TYR ARG VAL ALA ASN ASP LEU LYS GLN PHE VAL ASN  
 610 615 620  
 PRO ASP SER ALA GLU GLU THR GLN LEU LYS THR PHE PHE ASN GLN LEU  
 625 630 635 640  
 SER ALA ASP GLN PHE LYS ARG LEU GLY TRP THR PRO LYS VAL GLY GLU  
 645 650 655  
 SER ASN ASP ASP GLN LEU THR ARG PRO TYR ILE LEU SER MET ALA LEU  
 660 665 670  
 TYR ALA LYS ASN LYS ASP ALA ILE ALA GLN GLY HIS ASP LEU PHE THR  
 675 680 685  
 ALA ASN LYS ASP HIS LEU LEU GLN LEU PRO ALA ASP VAL ARG MET PHE  
 690 695 700  
 VAL LEU GLN ASN GLU VAL LYS ASN PHE GLY SER ALA THR LEU PHE ASP  
 705 710 715 720  
 GLN LEU LEU THR ALA TYR LYS GLN THR THR ASP SER SER TYR LYS ALA  
 725 730 735  
 ASP ILE LEU ALA ALA LEU THR SER THR PRO ASP ALA ALA LEU ILE ALA  
 740 745 750  
 LYS ILE VAL ASP GLN PHE GLU ASN ALA ASP THR ILE LYS PRO GLN ASP  
 755 760 765  
 LEU ARG SER TRP PHE ARG GLY VAL LEU SER ASN HIS ALA GLY GLU GLN  
 770 775 780  
 ALA ALA TRP ASP TRP VAL ARG ASN GLU TRP ALA TRP LEU GLU LYS THR  
 785 790 795 800  
 VAL GLY GLY ASP MET GLU PHE THR THR TYR ILE THR VAL ILE ALA GLY  
 805 810 815  
 ILE PHE ARG THR THR GLN ARG LEU ASP GLU PHE LYS LYS PHE PHE GLU  
 820 825 830  
 PRO LYS LEU PRO THR PRO GLY LEU THR ARG GLU ILE THR MET ASP THR  
 835 840 845  
 SER VAL ILE ALA SER ARG VAL ASP LEU ILE GLN ALA GLU GLN GLN ALA  
 850 855 860  
 VAL TYR GLU ALA VAL ALA LYS ALA ILE LYS  
 865 870

<210> 105

<211> 390

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 105

MET LYS ILE GLY ILE ASP ALA ILE GLU MET ASP THR PRO ASP PHE TYR  
 1 5 10 15  
 VAL ASP LEU VAL LYS LEU ALA LYS VAL ARG GLY ASP ASP PRO ASN LYS  
 20 25 30



TYR THR ILE GLY ILE GLY GLN ASP GLU GLN ALA VAL PRO PRO SER SER  
           35                    40                    45  
 GLN ASP ILE VAL THR LEU GLY ALA ASN ALA ALA ALA LYS VAL LEU THR  
           50                    55                    60  
 PRO ALA SER ARG ALA SER LEU GLY MET ILE LEU VAL GLY THR GLU SER  
 65                    70                    75                    80  
 GLY VAL ASP ALA SER LYS SER ALA ALA LEU PHE ILE HIS ASP LEU LEU  
                     85                    90                    95  
 VAL LEU PRO GLU TRP VAL ARG ALA VAL GLU LEU LYS GLU ALA CYS TYR  
           100                    105                    110  
 GLY GLY THR ALA ALA LEU MET MET ALA ARG ASP TYR VAL ALA SER HIS  
           115                    120                    125  
 PRO ASP LYS SER VAL LEU VAL ILE ALA ALA ASP ILE ALA ARG TYR GLY  
           130                    135                    140  
  
 LEU ALA THR ALA GLY GLU VAL THR GLN GLY ALA GLY ALA VAL ALA MET  
 145                    150                    155                    160  
 ILE VAL LYS ALA ASP PRO ARG LEU LEU THR ILE GLU PRO ASP SER VAL  
                     165                    170                    175  
  
 TYR ARG SER ALA SER ILE ASN ASP PHE TRP ARG PRO VAL TYR GLN ASP  
           180                    185                    190  
 THR ALA LEU ALA GLN GLY LYS TYR SER THR GLU GLN TYR LEU ALA PHE  
           195                    200                    205  
 PHE LYS THR VAL TRP GLU ARG TYR GLN ALA ASP HIS HIS LEU SER ALA  
           210                    215                    220  
 HIS ASP PHE ALA ALA MET THR PHE HIS LEU PRO TYR THR LYS MET GLY  
 225                    230                    235                    240  
 LYS LYS ALA LEU ASP LEU VAL LEU PRO THR THR ASP ASP ALA SER ALA  
                     245                    250                    255  
 GLN ARG LEU LYS ASN ARG PHE GLU ALA SER THR ARG TYR CYS ARG ARG  
           260                    265                    270  
 ILE GLY ASN ILE TYR THR GLY SER LEU TYR LEU GLY LEU LEU SER LEU  
           275                    280                    285  
 LEU ASP HIS ASP THR THR LEU GLN ALA GLY ASP ARG ILE GLY LEU PHE  
           290                    295                    300  
 SER TYR GLY SER GLY ALA VAL ALA GLU PHE PHE SER GLY ILE LEU GLN  
 305                    310                    315                    320  
 PRO GLN PHE LYS GLU GLN LEU HIS ALA ALA GLU HIS ALA GLN GLN LEU  
           325                    330                    335  
 THR LYS ARG GLN GLU LEU PRO VAL PRO GLU TYR GLU ALA ALA PHE SER  
           340                    345                    350  
 ASP LYS VAL PRO TYR ASP ALA ASP ASP TYR ARG PRO ASP PRO ALA TYR  
           355                    360                    365  
 TYR ARG GLY GLN PHE ILE LEU THR GLY VAL ILE GLY GLN GLU ARG HIS  
           370                    375                    380  
 TYR GLU LYS HIS GLN SER  
 385                    390

<210> 106

<211> 651

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<220>

<221> VARIANT

<222> (1)...(651)

<223> XAA = ANY AMINO ACID

<400> 106

MET PRO LYS ILE HIS GLN LEU SER ALA THR LEU SER ASN GLN ILE ALA  
1 5 10 15  
ALA GLY GLU VAL ILE GLU ARG PRO ALA SER VAL VAL LYS GLU LEU VAL  
20 25 30  
GLU ASN SER ILE ASP ALA PRO SER XAA THR GLN ILE ASP VAL LYS VAL  
35 40 45  
SER ALA ALA GLY LEU GLN THR ILE HIS VAL SER ASP ASN GLY ILE GLY  
50 55 60  
ILE ASP PRO ASP ASP VAL ALA THR ALA PHE LEU ARG HIS ALA THR SER  
65 70 75 80  
LYS ILE LEU THR THR ARG ASP LEU PHE ASN VAL HIS SER LEU GLY PHE  
85 90 95  
ARG GLY GLU ALA LEU ALA SER ILE ALA ALA VAL ALA ASP VAL THR LEU  
100 105 110  
THR THR ALA THR ASP ALA GLY ILE GLY ALA LYS ILE HIS VAL LYS GLY  
115 120 125  
GLY GLN VAL GLU SER GLN THR THR ALA ALA HIS ARG ARG GLY THR ASP  
130 135 140  
VAL GLU VAL SER ASP LEU PHE PHE ASN THR PRO ALA ARG LEU LYS TYR  
145 150 155 160  
MET LYS SER GLN GLN THR GLU LEU GLY LYS ILE VAL ASP ILE VAL SER  
165 170 175  
ARG LEU ALA LEU ALA ASN PRO LYS ILE ALA PHE THR VAL SER HIS ASP  
180 185 190  
GLY ASN MET MET VAL ARG THR ALA GLY GLN GLY ASP LEU ARG GLN THR  
195 200 205  
LEU ALA GLY ILE TYR GLY LEU PRO VAL ALA ARG SER MET VAL ASP PHE  
210 215 220  
GLN ALA GLU ASP LEU ASP PHE LYS VAL SER GLY LEU THR SER LEU PRO  
225 230 235 240  
GLU THR THR ARG ALA SER ARG ASN TYR LEU SER LEU VAL VAL ASN GLY  
245 250 255  
ARG TYR ILE LYS ASN PHE GLN LEU THR LYS ALA VAL ILE ALA GLY TYR  
260 265 270  
GLY SER LYS LEU MET VAL GLY ARG TYR PRO MET GLY VAL ILE SER ILE  
275 280 285  
GLN MET ASP ALA ALA LEU VAL ASP VAL ASN VAL HIS PRO THR LYS ALA  
290 295 300  
GLU VAL ARG LEU SER LYS GLU ASP GLN LEU SER HIS LEU LEU SER GLU  
305 310 315 320  
ALA ILE ARG ALA ARG LEU ALA LYS GLU ASN LEU ILE PRO ASP ALA MET  
325 330 335  
ASP ASN LEU PRO LYS ARG GLU ARG TYR ASP LEU ASP GLN LEU GLU LEU  
340 345 350  
THR LEU ASN LYS ILE SER LEU LYS THR THR ALA VAL PRO ASN GLN GLY  
355 360 365  
ALA GLU VAL ARG GLU ASN ALA ASP THR ASN THR VAL ASN THR PRO THR  
370 375 380  
SER GLN PRO ALA ALA GLN THR GLU ALA ALA VAL ASP LEU THR ILE ASN  
385 390 395 400  
ASP LEU ASP ASP ARG PRO ILE PHE ASP GLU PRO GLN ARG LEU ALA ALA  
405 410 415  
TRP ASP GLN ARG TYR GLN THR LEU ASP ALA ASN VAL ALA PRO ALA LEU  
420 425 430

VAL GLU ASP ALA ALA ALA SER ASP LEU LYS ARG PRO GLU PRO THR GLU  
 435 440 445  
 ARG PHE PRO ASP LEU THR TYR LEU ALA GLN VAL HIS GLY THR TYR LEU  
 450 455 460  
 LEU ALA GLU SER GLY ASP GLY LEU TYR ILE LEU ASP GLN HIS ALA ALA  
 465 470 475 480  
 GLN GLU ARG VAL ASN TYR GLU PHE TYR ARG GLN ALA ILE GLY GLU VAL  
 485 490 495  
 SER ASN ASP GLN GLN HIS LEU LEU VAL PRO ILE VAL LEU ASP TYR SER  
 500 505 510  
 ALA ALA ASP ALA ILE ASN ILE ARG THR HIS ARG ASP VAL LEU GLU ALA  
 515 520 525  
 VAL GLY LEU TYR LEU GLU ASP PHE GLY GLN ASN SER PHE VAL VAL GLU  
 530 535 540  
 HIS HIS PRO THR TRP PHE LYS ALA GLY GLN GLU GLU ASP THR ILE LYS  
 545 550 555 560  
 GLU MET VAL ASP TRP VAL LEU ARG ASP GLY LYS ILE SER VAL ALA ALA  
 565 570 575  
 PHE ARG GLU LYS THR ALA ILE MET MET SER CYS LYS ARG ALA ILE LYS  
 580 585 590  
 ALA ASN HIS HIS LEU ASP ASP GLN GLN ALA ARG ALA LEU LEU GLN LYS  
 595 600 605  
 LEU PRO GLN CYS GLU ASN PRO PHE ASN CYS PRO HIS GLY ARG PRO VAL  
 610 615 620  
 LEU VAL HIS PHE SER ASN THR ASP LEU GLU LYS MET PHE LYS ARG ILE  
 625 630 635 640  
 GLN ASP SER HIS GLU SER GLY GLU MET GLN ALA  
 645 650

<210> 107

<211> 387

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 107

MET ALA LEU VAL ASP ARG MET ASN HIS GLU VAL ARG GLN LEU LYS PRO  
 1 5 10 15  
 SER ASP ILE LEU GLN PHE ASN ALA GLU ILE SER GLY ILE GLU GLY ILE  
 20 25 30  
 VAL LYS LEU THR LEU GLY GLU PRO ASP PHE PRO THR PRO GLU HIS VAL  
 35 40 45  
 LYS ALA ALA GLY ILE GLN SER ILE GLU ASN ASP GLU SER HIS TYR THR  
 50 55 60  
 GLN SER LYS GLY LEU PRO GLY LEU ARG ALA THR ALA SER HIS TYR LEU  
 65 70 75 80  
 ALA THR LYS TYR LYS THR SER TYR ASP PRO GLU THR GLN ILE LEU ILE  
 85 90 95  
 THR ALA GLY ALA THR GLY GLY ILE TYR SER SER LEU THR ALA MET LEU  
 100 105 110  
 ASN LYS GLY ASP THR VAL ILE ILE PRO THR PRO ILE PHE PRO LEU TYR  
 115 120 125  
 ILE PRO ILE VAL LEU LEU ASN GLY ALA LYS PRO ILE PHE ILE ASP THR  
 130 135 140  
 SER ALA ASP GLY PHE ILE LEU LYS PRO GLU LYS LEU GLN GLN ALA ILE  
 145 150 155 160  
 GLU ALA ASN ARG ASP THR VAL LYS ALA VAL ILE LEU ASN TYR PRO THR  
 165 170 175

ASN PRO THR GLY VAL THR TYR ASN ARG ALA ASP LEU SER ALA LEU ALA  
 180 185 190  
 ASN VAL ILE LYS GLN TYR GLU ILE PHE VAL LEU SER ASP GLU ILE TYR  
 195 200 205  
 SER GLU LEU THR TYR SER GLY THR HIS VAL SER MET GLY GLU ILE LEU  
 210 215 220  
 PRO ASP GLN ALA ILE VAL LEU ASN GLY VAL SER LYS SER HIS ALA MET  
 225 230 235 240  
 THR GLY TRP ARG VAL GLY ILE THR ALA GLY PRO ALA ALA ILE ILE GLN  
 245 250 255  
 GLN ILE GLY LYS VAL SER GLU PHE THR ILE THR SER VAL THR THR ASN  
 260 265 270  
 ALA GLN ARG ALA ALA GLU GLU ALA LEU LYS ASN GLY MET GLU ASP SER  
 275 280 285  
 GLN PRO MET LYS GLN ALA TYR ARG LYS ARG ARG ASP PHE LEU MET LYS  
 290 295 300  
 ALA LEU PRO GLU ALA GLY LEU GLU VAL PRO HIS PRO ASP GLY ALA PHE  
 305 310 315 320  
 TYR ILE PHE ALA LYS LEU PRO ASP ARG PHE HIS ASP SER TRP LYS PHE  
 325 330 335  
 VAL TYR ALA LEU ALA ARG GLU ALA LYS VAL ALA VAL ILE PRO GLY ALA  
 340 345 350  
 SER PHE GLY PRO GLY GLY GLU GLY TYR VAL ARG ILE SER TYR ALA ALA  
 355 360 365  
 SER MET ALA ASP LEU LYS LEU ALA ALA GLU ARG ILE LYS GLN PHE MET  
 370 375 380  
 ALA THR HIS  
 385

<210> 108

<211> 519

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 108

LEU LEU VAL ASN TYR PHE ILE ASN PHE GLY MET PRO ALA SER LYS SER  
 1 5 10 15  
 GLY ILE GLU HIS ALA GLN ILE LYS ARG LYS ARG LEU PHE ASP LYS HIS  
 20 25 30  
 GLY GLU PRO TYR VAL PHE LEU LEU ARG ASP TRP GLU ARG ASP LEU HIS  
 35 40 45  
 THR ASN THR ALA ASN ALA GLY ILE THR ASP ASP HIS LEU VAL ASN MET  
 50 55 60  
 PHE ASP TYR TYR GLN HIS ALA CYS HIS VAL ASP ALA VAL ARG LEU LEU  
 65 70 75 80  
 PRO GLU GLN VAL ASP LEU GLY LEU LYS ASP LEU GLN TYR SER ASP ASP  
 85 90 95  
 TYR GLU HIS ASN ARG MET LEU VAL SER ARG ALA ASP GLY ARG LEU ALA  
 100 105 110  
 ALA ARG ILE ASN TYR VAL ARG GLY THR ARG GLN VAL VAL SER VAL GLU  
 115 120 125  
 LEU PHE ASP GLY VAL GLU ASN LEU TYR GLN VAL GLU PHE TYR ASP VAL  
 130 135 140  
 ARG GLY PHE LYS SER LEU VAL GLN TRP TYR THR PRO ASP ASN LYS VAL  
 145 150 155 160  
 GLY ASN GLU GLU TRP LEU THR VAL ASP GLY ARG PRO VAL ILE ARG ALA  
 165 170 175

PHE ASN LYS LYS ASN GLU ASP GLY LYS LEU LYS GLN THR GLY TRP ILE  
           180                          185                          190  
 LEU THR ASP ARG LYS GLY LYS ILE PHE GLN PHE ASP THR ILE ASP ALA  
           195                          200                          205  
 PHE PHE GLU HIS PHE ILE ASN ASP MET ASN GLU THR GLY GLN ASN VAL  
           210                          215                          220  
 PHE ILE LEU ASP ARG SER LEU LEU ALA ASP GLU ALA LEU ILE HIS LEU  
 225                          230                          235                          240  
 GLU LYS PRO ALA TYR THR ILE MET HIS LEU HIS ASN SER HIS ALA GLY  
           245                          250                          255  
 ASP ALA GLN ARG PRO MET ASP SER ILE MET ASN ASN ASN TYR GLU PHE  
           260                          265                          270  
 ALA LEU VAL ASN GLY ALA LYS TYR SER ALA PHE VAL SER ALA THR LYS  
           275                          280                          285  
 LYS GLN ALA ALA ASP VAL GLN ARG ARG PHE PRO TYR ILE LYS LYS SER  
           290                          295                          300  
 PHE HIS VAL PRO VAL GLY VAL VAL SER ASP ASP VAL LEU HIS ARG GLN  
 305                          310                          315                          320  
 ARG ILE LEU SER GLU ASN ARG ILE PHE GLY LYS VAL ILE ALA VAL ALA  
           325                          330                          335  
 ARG ILE ALA PRO GLU LYS ASN LEU ASN ASP LEU VAL ARG ALA ILE ALA  
           340                          345                          350  
 ILE VAL HIS LYS GLN ILE PRO GLN VAL THR LEU ASP LEU TYR ASP TYR  
           355                          360                          365  
 PRO ASP ALA THR ASN HIS TYR ALA GLU LYS ARG LYS ILE GLU LYS THR  
           370                          375                          380  
 ILE GLN GLU LEU SER LEU GLU GLY VAL VAL THR PHE LYS GLY TYR THR  
 385                          390                          395                          400  
 GLU ASN LEU GLU SER ALA TYR ASP THR ALA GLN ILE PHE GLY LEU THR  
           405                          410                          415  
 SER ILE MET GLU GLY PHE ASP LEU SER LEU LEU GLU ALA ILE SER HIS  
           420                          425                          430  
 GLY VAL VAL GLY VAL THR TYR ASP VAL ASN TYR GLY PRO ASN GLU ILE  
           435                          440                          445  
 VAL GLN ASP GLY ILE ASN GLY TYR VAL THR PRO TYR GLY ASP ILE HIS  
           450                          455                          460  
 ALA LEU ALA GLU LYS ILE GLN LEU LEU LEU SER ASP ARG ASP LYS MET  
 465                          470                          475                          480  
 GLN GLN MET SER THR ASN ALA TYR GLU SER ALA ASN ARG TYR SER GLU  
           485                          490                          495  
 GLU ASN VAL TRP LYS LYS TRP HIS LYS VAL LEU MET ASP ALA GLN LYS  
           500                          505                          510  
 SER GLU GLY GLU VAL THR LYS  
           515

<210> 109  
 <211> 195  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 109  
 MET ARG THR ALA THR ILE THR ARG THR THR LYS GLU THR ALA ILE THR  
   1                          5                          10                          15  
 ILE SER LEU ASN LEU ASP GLN GLN SER GLY ILE ASP ILE ASP THR GLY  
           20                          25                          30  
 ILE GLY PHE PHE ASP HIS MET LEU ASP ALA PHE ALA LYS HIS GLY ARG  
           35                          40                          45

PHE GLY LEU ILE VAL LYS ALA GLN GLY ASP LEU ASP VAL ASP PRO HIS  
 50 55 60  
 HIS THR ILE GLU ASP THR GLY ILE VAL LEU GLY SER CYS PHE LYS GLN  
 65 70 75 80  
 THR LEU GLY ASP LYS ALA GLY ILE GLU ARG PHE GLY ASN ALA PHE VAL  
 85 90 95  
 PRO MET ASP GLU SER LEU ALA ARG VAL VAL ASP LEU SER GLY ARG  
 100 105 110  
 ALA TYR LEU VAL PHE ASP ALA GLU LEU THR ASN GLN ARG LEU GLY GLY  
 115 120 125  
 PHE ASP THR GLU VAL THR GLU ASP PHE PHE GLN ALA MET ALA PHE ALA  
 130 135 140  
 GLY GLU PHE ASN LEU HIS ALA ALA VAL LEU TYR GLY ARG ASN THR HIS  
 145 150 155 160  
 HIS LYS ILE GLU ALA LEU PHE LYS ALA LEU GLY ARG SER MET GLN ALA  
 165 170 175  
 ALA VAL ALA LEU ASN PRO ALA VAL LYS GLY ILE PRO SER THR LYS GLY  
 180 185 190  
 VAL ILE SER  
 195

<210> 110  
 <211> 309  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 110  
 MET VAL THR ALA ALA ASP ASN ILE THR GLY LEU ILE GLY ASN THR PRO  
 1 5 10 15  
 LEU LEU LYS LEU ASN ARG VAL VAL PRO GLU GLY ALA ALA ASP VAL TYR  
 20 25 30  
 VAL LYS LEU GLU PHE PHE ASN PRO GLY GLY SER VAL LYS ASP ARG ILE  
 35 40 45  
 ALA LEU ALA MET ILE GLU ASP ALA GLU TYR LYS GLY VAL LEU LYS PRO  
 50 55 60  
 GLY GLY THR ILE VAL GLU PRO THR SER GLY ASN THR GLY ILE GLY LEU  
 65 70 75 80  
 ALA LEU VAL ALA ALA LYS GLY TYR HIS LEU ILE ILE THR MET PRO  
 85 90 95  
 GLU THR MET SER VAL GLU ARG ARG ALA LEU MET ARG GLY TYR GLY ALA  
 100 105 110  
 GLU LEU ILE LEU THR PRO GLY ALA ASP GLY MET PRO GLY ALA ILE LYS  
 115 120 125  
 LYS ALA GLU ALA LEU SER LYS GLU ASN GLY TYR PHE LEU PRO MET GLN  
 130 135 140  
 PHE GLN ASN PRO ALA ASN PRO ASP VAL HIS GLU ARG THR THR GLY GLN  
 145 150 155 160  
 GLU ILE ILE ARG SER PHE ASP GLY GLY THR PRO ASP ALA PHE VAL ALA  
 165 170 175  
 GLY VAL GLY THR GLY GLY THR LEU THR GLY VAL GLY ARG ALA LEU ARG  
 180 185 190  
 LYS ILE ASN PRO ASP VAL GLN ILE TYR ALA LEU GLU ALA ALA GLU SER  
 195 200 205  
 PRO MET LEU LYS GLU GLY HIS GLY GLY LYS HIS LYS ILE GLN GLY ILE  
 210 215 220  
 SER ALA GLY PHE ILE PRO ASP VAL LEU ASP THR ASN LEU TYR GLN ASP  
 225 230 235 240

ILE ILE GLU VAL THR SER ASP GLN ALA ILE ASP MET ALA ARG HIS VAL  
                   245                  250                  255  
 SER HIS GLU GLU GLY PHE LEU PRO GLY ILE SER ALA GLY ALA ASN ILE  
                   260                  265                  270  
 PHE GLY ALA ILE GLU ILE ALA LYS LYS LEU GLY LYS GLY LYS SER VAL  
                   275                  280                  285  
 ALA THR VAL ALA PRO ASP ASN GLY GLU ARG TYR LEU SER THR ASP LEU  
                   290                  295                  300  
 PHE LYS PHE ASP ASP  
 305

<210> 111  
 <211> 1097  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 111  
 MET LEU TRP LYS ASP ILE ARG LYS SER PHE THR THR SER TRP GLY ARG  
 1                  5                  10                  15  
 PHE PHE SER ILE LEU LEU LEU MET MET LEU GLY SER PHE ALA LEU VAL  
                   20                  25                  30  
 GLY LEU TRP VAL ALA GLY PRO ASP MET ARG ALA THR GLY ALA THR TYR  
                   35                  40                  45  
 PHE LYS GLN TYR ASN LEU ALA ASP LEU THR VAL ILE GLY GLU ASP GLY  
                   50                  55                  60  
 LEU ASP SER HIS ASP GLN LYS THR ILE GLN ALA THR ALA GLY ALA LYS  
 65                  70                  75                  80  
 GLN VAL GLU PHE GLY TYR LEU LYS ASP VAL THR LEU LYS GLY THR HIS  
                   85                  90                  95  
 ALA SER PHE ARG ILE MET SER LYS PRO ASP LYS ILE SER LYS TYR LYS  
                   100                  105                  110  
 LEU ALA SER GLY HIS MET PRO THR LYS THR ASN GLU ILE ALA ILE ASP  
                   115                  120                  125  
 ALA ASN TYR LYS GLY LYS TYR LYS LEU GLY ASP THR ILE LYS PHE VAL  
                   130                  135                  140  
 GLN ARG ALA ASP GLN THR GLY SER LYS VAL LEU LYS ARG THR GLN PHE  
 145                  150                  155                  160  
 LYS ILE VAL GLY PHE VAL TYR SER PRO GLU VAL LEU SER ALA ILE ASN  
                   165                  170                  175  
 LYS GLY ASP SER THR SER GLY SER GLY ASP LEU LYS GLY TYR GLY VAL  
                   180                  185                  190  
 VAL THR ALA ASN ASN PHE ASP SER ASP PHE TYR MET MET ALA ARG ILE  
                   195                  200                  205  
 THR TYR GLN ASN THR GLN LYS LEU ASP PRO TYR SER ASP GLN TYR THR  
                   210                  215                  220  
 ASP ARG ILE GLN SER HIS LYS THR ALA LEU ASN GLN ARG LEU LYS ASP  
 225                  230                  235                  240  
 ALA PRO ALA ASP ARG LEU ALA ALA ILE LYS LYS GLN TYR GLN LYS LYS  
                   245                  250                  255  
 ILE ASP ALA GLY GLN LYS LYS LEU ASP GLU ALA LYS ALA GLN LEU ASP  
                   260                  265                  270  
 SER ALA LYS GLU GLN LEU THR THR GLY GLN GLN GLN LEU ALA SER ALA  
                   275                  280                  285  
 LYS GLN GLN ILE THR ALA LYS GLN GLN GLU LEU ASP THR ALA VAL LYS  
                   290                  295                  300  
 ASN GLY GLN ALA GLN ILE ALA SER GLY GLU ALA GLN LEU GLN GLN ALA  
 305                  310                  315                  320

ALA THR GLN LEU SER GLN SER GLU LEU GLN LEU ALA SER ALA LYS GLN  
                   325                                  330                                  335  
 GLN LEU GLU ALA SER GLN GLN GLN LEU ASP ALA LYS HIS GLN ASP LEU  
                   340                                  345                                  350  
 ALA SER ALA LYS GLN GLN LEU ASP THR ALA ASN GLN GLN LEU ALA ASN  
                   355                                  360                                  365  
 SER GLN ALA GLN LEU ALA ALA LYS GLN GLU ILE ASP ALA ALA LEU  
                   370                                  375                                  380  
 THR ASN ASN PRO GLN ILE ALA GLN VAL PRO VAL PHE GLN GLN LYS GLN  
 385                                  390                                  395                                  400  
 ALA GLN TYR GLN ASN GLY ILE ALA GLN TYR ASN GLN GLY LEU GLU GLN  
                   405                                  410                                  415  
 TYR GLN ASN ASN LEU GLN ALA TYR ASN ASN GLN VAL ALA ALA TRP ASN  
                   420                                  425                                  430  
 THR ALA ASN ASN GLN LEU GLN GLN LYS TYR GLN GLU TYR ASN SER GLY  
                   435                                  440                                  445  
 ALA SER GLN PHE GLN GLN GLY GLN GLN SER TYR ALA ALA LYS GLN GLN  
                   450                                  455                                  460  
 GLU LEU GLU GLN ALA LYS GLN SER LEU ALA THR GLN GLN GLN SER GLY  
 465                                  470                                  475                                  480  
 GLN GLN GLN ILE GLU ALA ALA LYS GLN GLU MET ALA SER ASN GLU ALA  
                   485                                  490                                  495  
 THR LEU LYS THR LYS GLN ALA GLU TYR ASP GLN GLN ALA PRO ASN ALA  
                   500                                  505                                  510  
 GLU LYS GLU ILE GLN SER ASN SER LEU LYS LEU GLU ASP ALA LYS GLU  
                   515                                  520                                  525  
 ALA LEU LYS ASN LEU LYS ALA PRO THR TYR THR VAL ASP THR ARG ARG  
 530                                  535                                  540  
 GLU THR PRO SER GLY GLN GLY TYR MET VAL TYR ASP ASN THR SER ASN  
 545                                  550                                  555                                  560  
 ILE ILE ASP SER LEU ALA ASN ILE PHE PRO PHE PHE MET TYR PHE VAL  
                   565                                  570                                  575  
 ALA ALA LEU VAL THR PHE THR THR MET MET ARG PHE VAL ASP GLU GLU  
                   580                                  585                                  590  
 ARG ILE ASN SER GLY THR LEU VAL ALA LEU GLY TYR SER ARG HIS ASP  
                   595                                  600                                  605  
 VAL ILE LYS LYS PHE THR VAL TYR GLY PHE LEU SER SER LEU ILE GLY  
  
                   610                                  615                                  620  
 SER ILE LEU GLY ILE ILE SER GLY HIS ILE LEU LEU PRO LEU ILE VAL  
 625                                  630                                  635                                  640  
 TYR ASN ALA TYR HIS GLY GLY VAL ASN VAL PRO PRO ILE GLU LEU HIS  
                   645                                  650                                  655  
 PHE TYR PRO GLY ILE SER ILE ALA ALA LEU LEU LEU ALA MET ILE SER  
                   660                                  665                                  670  
 ALA VAL LEU PRO ALA TRP TRP VAL ALA ARG ARG GLU LEU LYS GLU ARG  
                   675                                  680                                  685  
 PRO ALA GLN LEU LEU LEU PRO LYS PRO PRO ALA ASN GLY SER LYS ILE  
                   690                                  695                                  700  
 LEU LEU GLU ARG VAL GLY PHE ILE TRP LYS ARG MET SER PHE THR HIS  
 705                                  710                                  715                                  720  
 LYS VAL THR ALA ARG ASN ILE PHE ARG TYR LYS LYS ARG MET PHE MET  
                   725                                  730                                  735  
 THR ILE PHE GLY VAL ALA GLY SER VAL THR LEU LEU PHE SER GLY LEU  
                   740                                  745                                  750  
 ALA VAL GLN HIS SER ILE GLY GLY VAL ASN ASP ARG GLN PHE ASN ASP  
                   755                                  760                                  765



ILE ILE LYS TYR ASP MET ILE VAL ALA GLN LYS ASP ASN ILE THR LYS  
 770 775 780  
 ASN GLN GLN THR SER LEU ASP LYS LEU PHE ASN GLU LYS ALA VAL LYS  
 785 790 795 800  
 LYS THR LYS SER VAL HIS TYR GLU THR VAL SER LYS ASN ALA GLY ALA  
 805 810 815  
 ASN HIS ASP ARG GLN ASP ILE THR MET ILE VAL PRO GLN SER THR LYS  
 820 825 830  
 ASN PHE ASP SER TYR ILE HIS LEU ALA THR ARG LYS GLY GLN ASN LYS  
 835 840 845  
 LEU THR LEU GLN ASP ASN GLY GLY ILE ILE SER GLU ARG LEU ALA LYS  
 850 855 860  
 LEU LEU ASN VAL ASP VAL GLY ASP THR ILE THR VAL LYS GLU ALA ASP  
 865 870 875 880  
 GLY THR ARG ARG LYS VAL LYS ILE THR GLY ILE THR GLU MET TYR MET  
 885 890 895  
 GLY HIS PHE LEU PHE MET ASN LYS THR ALA TYR GLN LYS ALA PHE ASN  
 900 905 910  
 THR ASN TYR LYS VAL ASN GLY HIS LEU VAL THR LEU ASN ASP ARG SER  
 915 920 925  
 ILE SER ASN THR ARG ALA HIS ALA ALA GLN PHE MET LYS GLU ASP GLY  
 930 935 940  
 VAL LYS GLY VAL VAL GLN ASN SER SER LEU ARG ASN GLN ILE THR THR  
 945 950 955 960  
 VAL VAL LYS SER LEU ASN LYS ILE MET GLY VAL LEU ILE VAL LEU ALA  
 965 970 975  
 ALA VAL LEU GLY VAL VAL ILE LEU TYR ASN LEU THR ASN ILE ASN VAL  
 980 985 990  
 ALA GLU ARG MET ARG GLU LEU SER THR ILE LYS VAL LEU GLY PHE TYR  
 995 1000 1005  
 ASP LYS GLU VAL THR LEU TYR ILE TYR ARG GLU THR ILE LEU LEU SER  
 1010 1015 1020  
 ILE ILE GLY ILE PHE VAL GLY TRP GLY PHE GLY GLU LEU LEU HIS GLU  
 1025 1030 1035 1040  
 TYR ILE ILE THR VAL VAL PRO PRO ASN ASN VAL MET PHE ASN PRO ALA  
 1045 1050 1055  
 LEU SER ALA PRO THR PHE ILE ILE PRO THR ILE VAL ILE ASN ILE ILE  
 1060 1065 1070  
 THR VAL ALA LEU GLY PHE PHE VAL ASN TYR SER LEU LYS ARG VAL ASN  
 1075 1080 1085  
 MET LEU GLU ALA LEU GLN SER VAL ASP  
 1090 1095

<210> 112

<211> 110

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 112

MET THR ALA ALA LYS GLN SER ILE THR GLU LEU TYR ASP LEU ILE GLN  
 1 5 10 15  
 SER ARG LYS SER GLN PRO VAL SER GLY SER TYR THR ASP TYR LEU PHE  
 20 25 30  
 THR LYS GLY LEU ASP LYS ILE LEU LYS LYS VAL GLY GLU GLU SER THR  
 35 40 45  
 GLU VAL ILE VAL ALA ALA LYS ASN PRO ASP ASP ALA ALA PHE ILE LEU  
 50 55 60

GLU VAL ALA ASP LEU THR TYR HIS VAL LEU VAL LEU MET VAL GLU ARG  
65 70 75 80

GLY ILE SER LEU ASP GLN ILE ALA THR GLU LEU ALA SER ARG GLU GLY  
85 90 95  
LYS MET SER ARG LEU LYS GLU ARG ASP LYS ILE ASN LYS TYR  
100 105 110

<210> 113  
<211> 110  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 113  
MET ILE PRO LEU ASP PHE LYS LYS ALA SER GLY LEU ILE THR THR VAL  
1 5 10 15  
ILE GLN ASP ALA THR THR LYS GLN VAL LEU MET VAL ALA TYR MET ASN  
20 25 30  
ALA GLU SER LEU GLU LYS THR MET THR THR GLY GLU THR TRP PHE TRP  
35 40 45  
SER ARG SER ARG ASN MET LEU TRP HIS LYS GLY GLU THR SER GLY ASN  
50 55 60  
THR GLN THR VAL GLN ALA ILE ALA VAL ASP CYS ASP ALA ASP THR LEU  
65 70 75 80  
LEU ILE THR VAL ASN PRO ALA GLY PRO ALA CYS HIS THR GLY HIS THR  
85 90 95  
SER CYS PHE TYR ARG GLN TYR THR GLU ARG LYS GLY THR GLN  
100 105 110

<210> 114  
<211> 261  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 114  
MET LYS LYS ILE TRP LEU GLY LEU GLY VAL LEU LEU LEU LEU ALA  
1 5 10 15  
ALA GLY CYS GLY VAL SER ARG GLN ALA ALA LYS SER SER ARG SER SER  
20 25 30  
ALA PRO VAL ARG SER ARG GLN ALA SER ALA THR SER THR PRO PRO ARG  
35 40 45  
PRO THR ARG LEU ALA ARG LEU LYS ALA LYS ASN LYS ALA GLN LEU VAL  
50 55 60  
TYR ALA PRO PHE GLY ASP SER LEU SER VAL GLY LEU PHE ALA ASP LYS  
65 70 75 80  
LYS THR THR ARG PHE THR SER LEU PHE ALA ARG GLN LEU ALA GLN LEU  
85 90 95  
THR GLY LYS THR VAL THR GLU ALA GLY ILE ALA GLU VAL GLY LYS THR  
100 105 110  
ALA THR ASN LEU GLY VAL PRO ALA LEU SER GLN LEU VAL ALA GLN HIS  
115 120 125  
PRO ASP VAL VAL THR ILE GLU PHE GLY THR ASN ASP ALA VAL GLY GLY  
130 135 140  
ALA THR PRO THR ALA LEU ASN ALA TYR GLN GLN ALA LEU THR THR ILE  
145 150 155 160  
VAL THR THR LEU GLN LYS GLU THR SER ALA GLN LEU ILE LEU MET THR  
165 170 175

THR TRP SER PRO ASN GLN GLY PRO TYR VAL ASN ALA ASP LEU LYS PHE  
180 185 190  
ASP ALA VAL VAL LYS THR VAL GLY GLN THR TYR GLN VAL PRO VAL VAL  
195 200 205  
ASP LEU ALA THR ILE TRP GLN GLY HIS ASP ASP VAL THR GLY PRO ALA  
210 215 220  
GLY THR VAL ILE PRO ASP PHE SER ALA ASN GLY PRO ARG ASP THR PHE  
225 230 235 240  
HIS PRO ASN GLN ARG GLY HIS ASP GLN ILE ALA THR GLN LEU ILE ASN  
245 250 255  
THR LEU GLU GLU ARG  
260

<210> 115  
<211> 512  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 115  
MET SER LEU PHE MET GLY LEU THR ASN ALA LEU VAL LEU ASN PHE ARG  
1 5 10 15  
ALA GLN SER PHE PRO CYS ALA SER LYS CYS GLY ILE ILE LYS VAL ARG  
20 25 30  
LEU LEU PHE ALA ASP GLU GLU ILE HIS PHE MET ALA LYS GLU LEU PRO  
35 40 45  
ASN ILE THR LYS ILE ALA VAL ALA LEU SER ASN HIS SER LYS MET LEU  
50 55 60  
VAL LEU ASP SER LEU MET ASP LYS ARG GLY HIS THR LEU LEU GLU ILE  
65 70 75 80  
ALA ARG GLU ALA ASN ILE GLN PRO GLN THR ALA SER TYR HIS LEU GLN  
85 90 95  
ASN PHE ILE ASN ASN GLY TRP VAL LYS MET GLU LYS SER GLY ARG PHE  
100 105 110  
HIS TYR PHE PHE LEU VAL SER ASP GLN VAL ALA ALA LEU ILE GLU GLN  
115 120 125  
PHE SER PRO LEU SER PRO SER ALA SER THR HIS THR LEU THR ARG ALA  
130 135 140  
LEU LYS VAL ASP LYS MET ARG THR PHE ARG SER CYS TYR ASP HIS MET  
145 150 155 160  
ALA GLY LYS ILE GLY VAL LEU ILE THR ASP GLN LEU LEU ALA ASP PRO  
165 170 175  
ARG ASN ASN LEU ILE ARG VAL VAL ASN GLU MET LYS ASP ALA GLY PHE  
180 185 190  
THR ALA PHE ASN ILE GLY PRO GLU PRO GLU PHE PHE LEU PHE LYS LEU  
195 200 205  
ASP GLU ASP GLY ASN PRO THR THR HIS LEU ASN ASP ARG GLY SER TYR  
210 215 220  
PHE ASP PHE ALA PRO LEU ASP MET GLY GLU ASN CYS ARG ARG ASP ILE  
225 230 235 240  
VAL LEU GLU LEU GLU LYS MET GLY PHE GLU VAL GLU ALA SER HIS HIS  
245 250 255  
GLU VAL ALA PRO GLY GLN HIS GLU ILE ASP PHE LYS TYR ALA ASP ALA  
260 265 270  
LEU GLU ALA ALA ASP ASN ILE GLN THR PHE LYS LEU VAL VAL LYS THR  
275 280 285  
ILE ALA ARG LYS HIS GLY LEU TYR ALA THR PHE MET PRO LYS PRO LEU  
290 295 300

HIS GLY ILE ASN GLY SER GLY MET HIS ILE ASN MET SER LEU PHE HIS  
 305 310 315 320  
 ASP LYS GLY ASN ALA PHE PHE ASP PRO ASP THR GLY ASP GLN LEU SER  
 325 330 335  
 GLU THR ALA MET HIS PHE LEU ALA GLY VAL LEU ARG HIS ALA TYR ALA  
 340 345 350  
 LEU THR ALA ILE ASN ASN PRO THR VAL ASN SER TYR LYS ARG LEU VAL  
 355 360 365  
 PRO GLY PHE GLU ALA PRO VAL TYR VAL ALA TRP SER GLY LYS ASN ARG  
 370 375 380  
 SER PRO LEU ILE ARG VAL PRO GLN SER ARG GLY LEU SER THR ARG LEU  
 385 390 395 400  
 GLU LEU ARG SER GLY ASP SER THR ALA ASN PRO TYR LEU ALA ILE ALA  
 405 410 415  
 ALA ILE LEU GLN ALA GLY LEU ASP GLY VAL LYS ASN GLN LEU LYS PRO  
 420 425 430  
 GLU GLU ALA VAL ASP ARG ASN ILE TYR ARG MET GLN ASP ASP GLU ARG  
 435 440 445  
 LYS ALA ASN HIS ILE GLN ASP LEU PRO SER THR LEU HIS ASN ALA LEU  
 450 455 460  
 LYS ALA LEU ALA ALA ASP ASP VAL VAL LYS ALA ALA LEU GLY LYS HIS  
 465 470 475 480  
 LEU TYR GLN SER PHE MET ASP SER LYS ASN LEU GLU TRP SER ALA TYR  
 485 490 495  
 ARG GLN GLN VAL SER GLU TRP GLU ARG GLN GLN TYR LEU GLU LEU TYR  
 500 505 510

<210> 116

<211> 495

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 116

MET VAL GLY GLU ASN VAL PHE THR PHE ASN SER GLY THR GLU PHE SER  
 1 5 10 15  
 GLN LEU GLN ARG LEU LYS ALA PHE ASN GLN ASN GLY ILE GLU SER LYS  
 20 25 30  
 LEU LEU LEU ARG ASN TYR ASN ARG PHE LEU TYR ARG ASP ALA LYS ARG  
 35 40 45  
 ALA GLY VAL ASN LYS ASP ALA TYR ILE ASN MET TYR ASP TYR PHE GLN  
 50 55 60  
 GLY VAL VAL GLY VAL GLU ARG LYS GLU GLN LYS LEU ARG LEU LEU GLU  
 65 70 75 80  
 SER ILE PRO LEU THR LYS TYR HIS VAL VAL GLY ILE ASP ASN ASN THR  
 85 90 95  
 THR THR ILE ASP LEU LEU GLY ARG THR LEU ALA LYS ILE THR VAL MET  
 100 105 110  
 PRO GLU THR VAL GLY LEU VAL GLY SER ILE ASP TYR TYR ASP ARG PHE  
 115 120 125  
 ASP HIS LYS GLU LEU THR GLU PHE TRP ASP TRP ARG GLY PHE LYS SER  
 130 135 140  
 MET GLU GLN ASN TYR ASN PRO ASP GLY THR VAL ALA ALA GLN LYS PHE  
 145 150 155 160  
 LEU ASP GLN LYS GLY HIS VAL VAL LEU GLU ILE ILE HIS MET ASN LYS  
 165 170 175  
 ASN GLY GLN LEU ALA PRO THR MET TRP LYS LEU VAL HIS TYR GLN GLY  
 180 185 190

HIS ASP TYR VAL PHE ASP SER GLU ASP ASP LEU PHE ARG PHE PHE LEU  
 195 200 205  
 ASN GLU ILE SER LYS GLY ASN PRO GLY ILE MET ILE SER ASP ARG ARG  
 210 215 220  
 THR LEU ASP ALA ALA VAL LYS GLN VAL ASN HIS ALA THR ALA LYS LEU  
 225 230 235 240  
 ALA PHE ILE HIS GLU GLY ASP LEU PHE LEU LYS GLY GLU GLY LYS LYS  
 245 250 255  
 ARG VAL PRO ASN VAL ILE TYR ASN GLU VAL LEU SER GLU GLN HIS PRO  
 260 265 270  
 PHE SER THR VAL ILE PHE PRO THR HIS ASP GLN VAL LYS ALA ILE GLU  
 275 280 285  
 THR GLN TYR PRO HIS LEU THR ILE ALA ALA ALA PRO ASP THR TYR ALA  
 290 295 300  
 GLN THR PRO LYS ALA LYS LYS ILE GLN PRO ASP HIS PRO ARG LEU ALA  
 305 310 315 320  
 TYR ILE GLY ARG LEU PHE PRO ASP LYS GLN ILE THR ASP LEU VAL ASP  
 325 330 335  
 ALA PHE GLU ARG VAL HIS ARG GLU ARG PRO ASP ALA GLU LEU PHE LEU  
 340 345 350  
 LYS GLY TYR PHE SER ASP GLU ALA TYR ARG ARG GLU ILE ARG ASP ARG  
 355 360 365  
 ILE HIS LYS LYS LYS LEU ASP ASP ALA ILE HIS LEU VAL ALA TYR SER  
 370 375 380  
 ASN ASP ASN GLN ASP ILE LEU ASP LYS THR THR LEU PHE VAL SER ALA  
 385 390 395 400  
 ALA LYS SER GLU ALA PHE GLY MET ASN SER LEU GLU ALA MET SER TYR  
 405 410 415  
 GLY ILE PRO VAL VAL ALA TYR GLY CYS HIS PHE LEU LYS HIS ASN LEU  
 420 425 430  
 LEU VAL ASN ARG GLN ASN GLY VAL ALA VAL VAL ASN MET THR PRO SER  
 435 440 445  
 GLU LEU GLY LYS ALA ILE LEU VAL VAL LEU GLN ASP ASN ARG LEU TYR  
 450 455 460  
 HIS LYS LEU GLN ALA GLY ALA LEU SER THR ALA LYS GLN HIS SER GLU  
 465 470 475 480  
 ALA ASP PHE ILE GLY ALA TRP LYS SER VAL LEU SER ALA PHE PHE  
 485 490 495

<210> 117

<211> 138

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 117

MET GLU ILE ILE LEU VAL GLY HIS ALA HIS THR ALA LYS ALA PHE LYS  
 1 5 10 15  
 GLU ALA VAL GLU MET ILE TYR GLY GLU VAL PRO ASN PHE HIS PRO ILE  
 20 25 30  
 ASP PHE THR PRO LYS GLU GLY LEU GLN SER LEU THR ASN LYS ILE ILE  
 35 40 45  
 SER ALA ILE ASP PRO LYS LYS ALA SER SER THR LEU ILE ILE THR ASP  
 50 55 60  
 LEU PHE SER GLY THR PRO TYR ASN ALA ALA ALA GLU LEU VAL LEU LYS  
 65 70 75 80  
 LYS LYS ALA ALA ASP VAL VAL ALA GLY MET CYS LEU PRO MET LEU LEU  
 85 90 95

GLU VAL ALA VAL ASN ALA ASN SER MET ASP VAL GLY GLN LEU VAL SER  
           100                          105                  110  
 HIS LEU MET LYS SER LYS GLU GLU PHE SER THR SER LEU SER GLU LYS  
           115                          120                  125  
 LEU THR ALA ASN ALA LYS GLU ASP ASP PHE  
           130                          135

<210> 118  
 <211> 266  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 118  
 MET SER ASP TRP LEU SER LEU LEU GLY LYS THR ILE ILE VAL THR GLY  
   1                  5                          10                  15  
 GLY SER SER GLY ILE GLY GLU ALA ILE VAL LYS GLU LEU LEU GLN ASN  
           20                          25                  30  
 GLY ALA ASN VAL VAL ASN GLY ASP LEU ARG GLU GLY SER ILE GLN ASP  
           35                          40                  45  
 PRO ARG LEU THR TYR VAL LYS THR ASP VAL THR ASN PRO GLU ALA VAL  
           50                          55                  60  
 GLU ASN LEU ALA LYS VAL ALA THR GLN ILE ASN GLY GLU ILE TRP GLY  
   65                          70                          75                  80  
 VAL VAL ASN ASN ALA GLY ILE ASN LYS PRO ARG VAL LEU VAL ASP PRO  
           85                          90                  95  
 LYS ASP PRO HIS GLY LYS TYR GLU LEU ASP VAL HIS THR PHE ASP GLN  
           100                          105                  110  
 ILE PHE ASN VAL ASN VAL LYS SER VAL PHE LEU VAL SER GLN ALA ALA  
           115                          120                  125  
 VAL ARG ARG MET VAL LYS GLN ARG HIS GLY VAL ILE VAL ASN MET SER  
           130                          135                  140  
 SER GLU ALA GLY LEU GLU GLY SER VAL GLY GLN SER VAL TYR SER ALA  
   145                          150                          155                  160  
 SER LYS GLY ALA ILE ASN GLY PHE THR ARG SER TRP ALA LYS GLU LEU  
           165                          170                  175  
 GLY LYS PHE ASN ILE ARG VAL VAL GLY VAL ALA PRO GLY ILE MET GLU  
           180                          185                  190  
 ALA THR GLY LEU ARG THR PRO ASP TYR GLU GLU ALA LEU ALA TYR THR  
           195                          200                  205  
 ARG GLY THR THR VAL GLU ALA ILE ARG ALA GLY TYR LYS SER THR SER  
           210                          215                  220  
 THR THR PRO MET GLY ARG SER GLY LYS LEU SER GLU VAL ALA ASP LEU  
   225                          230                          235                  240  
 VAL ASN TYR PHE VAL SER ASN ARG ALA SER TYR ILE THR GLY VAL THR  
           245                          250                  255  
 THR ASN VAL ALA GLY GLY LYS SER ARG GLY  
           260                          265

<210> 119  
 <211> 346  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 119  
 MET ASP LEU GLN LEU MET ALA ALA LEU SER ASN ALA ASP ALA ILE ALA  
   1                  5                          10                  15  
 ALA ASN GLU GLY GLU VAL ARG ALA VAL LEU ARG HIS HIS LEU ALA SER

20 25 30  
 TYR GLY LEU THR SER GLN THR ASP GLY LEU GLY SER LEU ILE PHE THR  
 35 40 45  
 LYS GLU ALA ALA ASP PRO GLN PHE SER VAL MET LEU TYR GLY HIS MET  
 50 55 60  
 ASP GLU VAL GLY TYR MET VAL ARG THR ILE THR PRO GLU GLY LEU LEU  
 65 70 75 80  
 ARG LEU MET VAL VAL GLY GLY VAL LYS PRO ALA ALA SER HIS TRP GLN  
 85 90 95  
 ASN VAL ARG ILE THR THR ALA ALA GLY HIS LYS LEU PRO GLY MET VAL  
 100 105 110  
 ILE ARG ASP ASP THR LEU PRO ALA PHE ASP GLN VAL LEU CYS ASP VAL  
 115 120 125  
 GLY ALA ASN SER ALA ASP ASP VAL ALA ALA LEU GLY ILE ALA ILE GLY  
 130 135 140  
 ASP MET VAL THR PHE ALA THR LYS PHE HIS ALA TYR ALA PRO ASP ASP  
 145 150 155 160  
 VAL PHE GLY GLY LYS ALA LEU ASP ASP ARG LEU GLY CYS TYR VAL GLY  
 165 170 175  
 ALA GLN LEU LEU ALA GLU LEU ALA ASP GLU LYS LEU PRO PHE THR LEU  
 180 185 190  
 HIS PHE ALA ALA THR SER SER GLU GLU VAL GLY ILE ARG GLY ALA LYS  
 195 200 205  
 THR ALA THR GLN LEU ILE LYS PRO ASP LEU ALA PHE ILE VAL ASP VAL  
 210 215 220  
 ALA THR PHE GLN ASN PRO ARG GLU ARG GLY GLU VAL ASN GLN ARG GLN  
 225 230 235 240  
 VAL GLY LYS GLY PRO ILE LEU THR HIS PHE ASP ARG THR LEU ALA PRO  
 245 250 255  
 ASN ARG ARG LEU GLN GLN PHE VAL LYS ALA THR ALA VAL ALA ALA GLU  
 260 265 270  
 ILE PRO LEU GLN LEU ASP MET PHE ASN GLY GLY GLY THR ASP GLY GLY  
 275 280 285  
 GLU ALA HIS LYS VAL GLY SER GLY ILE PRO THR VAL VAL THR ILE LEU  
 290 295 300  
 PRO CYS ARG TYR GLY HIS CYS ALA GLN SER LEU ALA HIS THR ARG ASP  
 305 310 315 320  
 VAL ASP GLN MET VAL ALA LEU TYR ALA ALA MET CYS ARG GLN LEU SER  
 325 330 335  
 ALA LYS LEU VAL ALA ALA ALA HIS THR PHE  
 340 345

<210> 120

<211> 407

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 120

MET LYS LEU VAL PHE CYS HIS PHE LEU GLN GLY GLY GLU LEU LEU VAL

1 5 10 15  
 ILE SER SER ALA GLN THR PRO THR VAL CYS ILE GLU PRO GLN ASP ARG  
 20 25 30  
 ARG MET ARG VAL THR ALA ILE PHE ILE ARG PRO THR HIS PRO ALA THR  
 35 40 45  
 MET PRO GLU MET THR THR ASN PHE ASP ALA ILE LEU ALA ASP PRO ASN  
 50 55 60

ILE ASP VAL VAL VAL GLU ALA ILE GLY GLY LEU HIS PRO ALA TYR ASP  
 65 70 75 80  
 TYR ILE LEU ARG ALA LEU GLN HIS GLY LYS HIS VAL VAL THR ALA ASN  
 85 90 95  
 LYS ALA VAL VAL ALA GLN HIS LEU PRO GLU PHE ILE THR THR ALA ALA  
 100 105 110  
 GLN HIS HIS VAL ARG PHE TYR PHE GLU ALA THR THR GLY GLY GLY ILE  
 115 120 125  
 PRO TRP ILE ARG ASN LEU GLU ARG ALA ALA ARG ILE ASP GLN ILE ASP  
 130 135 140  
 THR ILE GLU GLY ILE PHE ASN GLY THR SER ASN TYR ILE LEU ASP GLN  
 145 150 155 160  
 MET GLN ARG ALA HIS LEU ASP PHE ASP PRO VAL LEU LEU ALA ALA LYS  
 165 170 175  
 ASP MET GLY TYR ALA GLU ALA ASP PRO SER ALA ASP ILE ASP GLY ASP  
 180 185 190  
 ASP VAL VAL ASN LYS LEU LYS ILE SER ALA ALA LEU ALA TYR ASP MET  
 195 200 205  
 ILE PRO PRO ARG ASP VAL PRO LYS PHE GLY ILE ARG ASN VAL THR LYS  
 210 215 220  
 ALA ASP ILE ASP PHE PHE ALA SER ARG HIS GLN VAL LEU ARG LEU ILE  
 225 230 235 240  
 GLY LYS SER ARG ARG VAL GLY ASN HIS TYR SER MET VAL VAL GLU PRO  
 245 250 255  
 ARG LEU TYR PRO ALA THR ALA LEU ALA ALA ASN THR PHE GLU ASN PHE  
 260 265 270  
 ASN LEU ILE ARG LEU HIS GLY GLN THR ILE GLY ASP LEU GLN PHE TYR  
 275 280 285  
 GLY GLN GLY ALA GLY LYS TYR PRO THR ALA ASN ALA ILE VAL GLN ASP  
 290 295 300  
 LEU PHE ASP ILE LEU GLU ASN ALA PRO HIS LEU THR ARG HIS PHE ASP  
 305 310 315 320  
 GLN ASN LEU GLN PHE ASP ALA ASP LEU ASN THR ALA ASP TYR LEU LEU  
 325 330 335  
 ARG ALA ASP PRO LEU THR PHE ALA MET PHE ASN ASP LYS ASP THR GLU  
 340 345 350  
 VAL VAL ARG ASP HIS LEU LEU ILE LYS GLN ILE PRO THR GLY GLU MET  
 355 360 365  
 HIS ARG LEU MET ARG GLY VAL LEU ALA ILE ASP ALA HIS ALA PHE MET  
 370 375 380  
 ALA ALA ILE GLY ASP SER GLU LEU THR THR ARG ASN VAL LYS GLU GLN  
 385 390 395 400  
 VAL ASP GLN GLY VAL ILE GLU  
 405

<210> 121

<211> 524

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 121

MET LEU MET PRO TRP LEU LEU THR THR LEU ARG ARG ASP LEU MET GLU  
 1 5 10 15  
 ILE LEU THR ASP TYR MET PRO TRP ILE ILE ALA ALA VAL LEU LEU ILE  
 20 25 30



LEU LEU PHE ILE PHE LEU ALA THR HIS ARG LYS THR ALA LEU PRO ASN  
 35 40 45  
 GLU VAL LEU ILE ILE SER GLY ALA LEU ILE SER GLY LYS HIS SER PHE  
 50 55 60  
  
 ARG ASP VAL ASN GLY ASN ARG VAL LYS LEU ILE THR ASN GLY GLY SER  
 65 70 75 80  
 PHE ILE LEU PRO ILE LEU GLN ARG TRP ASP VAL LEU SER LEU ASN THR  
 85 90 95  
 ARG THR ILE GLU VAL ALA THR PRO GLU VAL TYR THR GLN GLN GLY VAL  
 100 105 110  
 PRO ILE ILE VAL ASN GLY THR VAL ILE LEU LYS ILE GLY SER SER GLN  
 115 120 125  
 GLU GLU VAL ALA THR ALA ALA GLU GLN PHE LEU GLY LYS ASN ASP GLU  
 130 135 140  
 GLN ILE ASN SER GLU ALA THR GLU ILE LEU GLU GLY HIS LEU ARG ALA  
 145 150 155 160  
 ILE LEU GLY THR LEU THR VAL GLU ASP THR TYR GLN ASN ARG ASP ALA  
 165 170 175  
 PHE ALA GLU LYS VAL GLN ASP VAL ALA SER SER ASP LEU ALA LYS MET  
 180 185 190  
 GLY LEU GLN ILE ILE SER PHE THR ILE LYS ASP ILE ALA ASP LYS ASN  
 195 200 205  
 GLY TYR LEU ASP SER LEU GLY LYS LYS GLN ILE ALA GLU VAL LYS LYS  
 210 215 220  
 ASN ALA ALA VAL ALA GLU ALA ALA ALA ASN ARG ASP THR ARG ILE GLN  
 225 230 235 240  
 GLN ALA GLN ALA ASP GLN GLU ALA LYS GLN GLN GLU ILE GLU ARG GLN  
 245 250 255  
 THR GLN ILE ALA ASP ALA GLU ARG GLU GLN GLN VAL LYS MET ALA ASP  
 260 265 270  
 PHE LYS LYS GLN GLN GLU ILE ALA GLN ALA GLN ALA ASP GLN ALA ALA  
 275 280 285  
 ILE VAL GLU GLN MET LYS ALA LYS GLN VAL GLN LYS GLU LYS ASP ILE  
 290 295 300  
 GLU LEU ALA GLN LYS ASN ALA GLU LEU GLN GLU GLN GLU LEU ASN ALA  
 305 310 315 320  
 THR VAL ARG LYS GLN ALA ASP ALA ASP LEU TYR LYS ALA GLN ARG ALA  
 325 330 335  
 ALA GLU ALA GLN LYS ALA THR GLN ILE ALA ALA ALA GLU ALA SER ALA  
 340 345 350  
 LYS GLU VAL GLU LEU ASP ALA GLU ALA LYS ALA ASN ALA THR LYS ALA  
 355 360 365  
 ILE GLY GLU ALA GLU ALA GLY LYS THR LYS ALA ILE GLY LEU ALA GLN  
 370 375 380  
 ALA GLU ALA ILE ALA LYS GLN ALA GLU ALA ALA ARG GLN LEU ASP GLU  
 385 390 395 400  
 SER GLY ARG PHE LYS MET THR ILE GLU ALA MET PRO LYS ILE ILE GLU  
 405 410 415  
 ALA ALA MET SER PRO TYR ALA ASN VAL ASP SER ILE LYS LEU TYR GLY  
 420 425 430  
  
 ASP GLY ASP LEU THR ASN GLN THR SER GLY SER LEU VAL LYS GLN LEU  
 435 440 445  
 ASP MET LEU GLN GLU VAL ALA GLY ILE ASP ILE ARG GLY MET LEU ASN  
 450 455 460  
 GLY ALA LEU MET HIS GLN ALA GLY ASN GLN PRO VAL VAL ASP ALA ILE

465                    470                    475                    480  
 LYS HIS HIS GLU GLN PRO ALA ALA LYS ALA PRO ASP THR LYS GLN PRO  
                          485                    490                    495  
 ALA PRO ALA PRO LYS SER ASP GLN PRO ALA THR THR GLU GLN ALA ALA  
                          500                    505                    510  
 SER SER THR PRO SER ARG MET ALA GLU LYS GLN LYS  
                          515                    520

<210> 122

<211> 373

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 122

MET LYS ILE LYS ALA ALA VAL VAL ASP GLU LYS GLY ALA ASP PHE LYS  
 1                    5                    10                    15  
 ILE ARG ASP ASP VAL GLU LEU ALA PRO MET GLY PRO ASP ASP LEU GLN  
                          20                    25                    30  
 VAL HIS MET VAL ALA SER GLY ILE CYS HIS SER ASP GLU ALA LEU ARG  
                          35                    40                    45  
 ILE GLY ASP ALA VAL ILE GLY TYR PRO ILE VAL LEU GLY HIS GLU GLY  
                          50                    55                    60  
 SER GLY ILE VAL GLU LYS VAL GLY PRO GLU VAL THR GLN PHE LYS PRO  
 65                    70                    75                    80  
 GLY ASP HIS VAL LEU SER PHE TYR ALA CYS GLY ASN CYS LYS ASN  
                          85                    90                    95  
 CYS LEU LYS GLY ILE PRO THR GLN CYS LEU ASN TYR ALA HIS ASN ASN  
                          100                    105                    110  
 LEU SER GLY THR ARG PRO ASP GLY SER ALA HIS PHE THR GLU ASN GLY  
                          115                    120                    125  
 LYS PRO VAL ALA ASP MET PHE ASP GLN SER SER PHE THR THR THR THR  
                          130                    135                    140  
 VAL VAL ARG GLU ARG ASN ALA VAL LYS VAL ASP LYS ASP LEU ASP LEU  
 145                    150                    155                    160  
 ARG LYS LEU GLY PRO LEU GLY CYS GLY TYR VAL THR GLY SER GLY THR  
                          165                    170                    175  
 VAL LEU ASN THR LEU LYS PRO LYS PRO GLY ASP THR ILE ALA VAL THR  
                          180                    185                    190  
 GLY THR GLY ALA VAL GLY LEU ALA ALA MET MET ALA GLY LYS ILE SER  
                          195                    200                    205  
 GLY CYS THR LYS VAL ILE ALA ILE ASP ILE VAL ASP SER ARG LEU GLU  
                          210                    215                    220  
 LEU ALA LYS GLU LEU GLY ALA THR ASP VAL VAL ASN SER LYS THR GLU  
 225                    230                    235                    240  
 ASP PRO VAL ALA VAL LYS LYS LEU THR GLY GLY LEU GLY VAL ASP  
                          245                    250                    255  
 TRP ALA VAL ASP THR THR GLY VAL LYS ALA VAL MET GLU ASP THR ILE  
                          260                    265                    270  
 GLN MET LEU ALA GLN GLY GLY THR THR ALA THR ILE ALA VAL THR PRO  
                          275                    280                    285  
 HIS HIS ILE ASP VAL ASP THR TRP ASN ASP LEU CYS VAL ASN ASP LYS  
                          290                    295                    300  
 LYS ILE VAL GLY VAL ASN MET GLY ASP SER ILE PRO GLN ILE ASP VAL  
 305                    310                    315                    320  
 PRO ARG LEU ILE GLU PHE TYR LYS GLN GLY MET PHE ASP PHE ASP LYS  
                          325                    330                    335  
 THR GLU LYS PHE TYR GLN PHE ASP GLN ILE ASN GLU ALA ASN ALA ASP

340                      345                      350  
 SER ARG SER GLY LYS THR ILE LYS PRO VAL LEU ILE ILE ASP LYS ASP  
 355                      360                      365  
 TYR VAL PRO GLY LYS  
 370

<210> 123  
 <211> 215  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 123  
 MET ALA GLY VAL ILE VAL GLY ASP TYR ALA GLN PHE SER LYS LYS ARG  
 1                      5                      10                      15  
 ASP ASP VAL VAL LYS ALA ALA ILE PHE GLY VAL ILE PRO ALA GLY VAL  
 20                      25                      30  
 LEU MET ILE ALA VAL GLY ALA ILE LEU THR ILE ALA PHE LYS SER THR  
 35                      40                      45  
 ASP ILE SER SER LEU PHE MET LYS ILE GLY SER PRO VAL ILE GLY GLY  
 50                      55                      60  
 LEU ALA LEU ILE LEU GLY THR TRP LYS VAL ASN VAL VAL ASN ALA TYR  
 65                      70                      75                      80  
 SER GLY GLY ILE ALA VAL ALA ASN ILE PHE ASN ILE PRO GLU LYS TYR  
 85                      90                      95  
 ARG LYS LEU THR LEU PHE LEU VAL GLY VAL GLY GLY THR ILE LEU SER  
 100                      105                      110  
 ILE LEU GLY ILE LEU ASN TYR PHE GLU PRO VAL MET THR ILE PHE SER  
 115                      120                      125  
 ALA MET ILE PRO PRO VAL ALA GLY ALA MET ALA ALA SER TYR TRP VAL  
 130                      135                      140  
 ILE HIS ARG GLY GLU MET HIS SER TRP GLN PRO VAL ALA GLY VAL ASN  
 145                      150                      155                      160  
 TRP LEU GLY LEU THR ALA TRP ALA LEU GLY ALA VAL ILE GLY VAL LEU  
 165                      170                      175  
 PRO VAL ARG TRP PRO ALA ILE PRO ASN ILE PRO VAL LEU GLY ILE ILE  
 180                      185                      190  
 LEU ALA PHE VAL LEU TYR TYR ALA GLY ALA LYS ILE HIS PRO GLU TRP  
 195                      200                      205  
 ASP LYS ALA SER GLU LEU ASN  
 210                      215

<210> 124  
 <211> 158  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 124  
 MET ALA ASN GLU VAL MET ASN ARG ARG ASN ASN GLU LEU MET ASN ASP  
 1                      5                      10                      15  
 VAL ASN ASP PRO PHE PHE ASP ASN LEU ALA ARG ARG PHE PHE GLY PRO  
 20                      25                      30  
 VAL SER ASP TRP MET ASP TRP ALA THR PRO SER ILE VAL SER THR ALA  
 35                      40                      45  
 VAL ASN GLY LEU LEU THR ASP VAL LYS GLU THR LYS ASP ALA TYR GLU  
 50                      55                      60  
 VAL HIS VAL ASP VAL PRO GLY ILE ASP LYS ASN ASN ILE LYS LEU ASN  
 65                      70                      75                      80

TYR HIS ASP GLY ILE LEU SER ILE ASN VAL HIS LYS ASP ASP ILE THR  
                   85                  90                  95  
 ASP HIS ALA ASP LYS ASN GLY ASN VAL MET MET SER GLU ARG SER TYR  
                   100                  105                  110  
 GLY THR MET SER ARG SER TYR GLN LEU PRO ASN VAL ASP ASP SER ASN  
                   115                  120                  125  
 ILE LYS ALA ASN TYR LYS ASP GLY VAL LEU ASN ILE THR CYS PRO LYS  
                   130                  135                  140  
 LEU THR GLU SER LYS GLU SER GLY HIS ASN ILE GLU ILE GLN  
 145                  150                  155

<210> 125  
 <211> 317  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<220>  
 <221> VARIANT  
 <222> (1)...(317)  
 <223> XAA = ANY AMINO ACID

<400> 125  
 MET GLY LEU THR PRO ARG PHE MET PRO ASN ALA LEU ARG GLY ARG ASP  
 1                  5                  10                  15  
 TYR LEU ASN VAL HIS PRO GLU ALA ARG ALA ALA ASP LEU LYS THR ALA  
                   20                  25                  30  
 MET THR ASP PRO ASP ILE LYS GLY ILE ILE CYS ALA ILE GLY GLY ASP  
                   35                  40                  45  
 ASP THR TYR ARG ILE VAL PRO TYR LEU LEU ASP ASP PRO ALA PHE ILE  
                   50                  55                  60  
 LYS THR VAL GLN THR GLN PRO LYS ILE PHE THR GLY PHE SER ASP THR  
 65                  70                  75                  80  
 THR ILE ASN HIS LEU MET PHE TYR GLN LEU GLY MET THR THR PHE TYR  
                   85                  90                  95  
 GLY PRO ASN PHE LEU ASN ASP LEU ALA GLU LEU ASP THR HIS LEU LEU  
                   100                  105                  110  
 PRO TYR THR ALA ALA SER PHE GLN HIS PHE PHE GLU ASN PRO ALA THR  
                   115                  120                  125  
 THR ALA ILE THR SER SER PRO THR TRP TYR GLU GLU ARG THR ASP PHE  
                   130                  135                  140  
 SER ALA ASP GLN LEU GLY VAL PRO ARG LYS ALA HIS PRO GLU GLN HIS  
 145                  150                  155                  160  
 GLY TYR LEU ALA LEU ARG GLY HIS GLY GLN VAL THR GLY THR LEU LEU  
                   165                  170                  175  
 GLY GLY CYS LEU ASP SER LEU HIS ASP LEU LEU TYR PRO VAL ARG TYR  
                   180                  185                  190  
 ASP ASP GLU PRO GLN VAL ALA LYS LYS TYR HIS LEU PHE PRO GLN ASP  
                   195                  200                  205  
 TRP THR ASP LYS ILE LEU PHE ILE GLU THR SER GLU ASP LYS ILE SER  
                   210                  215                  220  
 PRO ALA THR TYR ARG GLU TYR LEU GLU HIS LEU ALA ASP HIS GLY VAL  
 225                  230                  235                  240  
 LEU GLN GLN VAL LYS ALA ILE LEU VAL GLY LYS PRO XAA ASN GLU THR  
                   245                  250                  255  
 TYR PHE ALA ASP TYR GLN GLN VAL LEU LEU ASP VAL THR GLN PRO TYR  
                   260                  265                  270  
 GLN THR PRO ILE LEU TYR ASN LEU ASN PHE GLY HIS ALA TYR PRO ARG

275                      280                      285  
 THR VAL LEU PRO TYR GLY LEU GLN ALA THR ILE ASN PHE ASP ARG ARG  
 290                      295                      300  
 GLN LEU THR VAL ASP GLU PRO TYR PHE SER ASN PRO LEU  
 305                      310                      315

<210> 126  
 <211> 417  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 126  
 MET GLU ASP ILE ASN MET GLU SER THR ALA LEU ARG ILE TYR GLY LYS  
 1                      5                      10                      15  
 LYS ASP LEU ARG ILE ASP THR PHE ASP LEU PRO GLU MET LYS ASP ASP  
 20                      25                      30  
 GLU ILE LEU ALA THR VAL VAL SER ASP THR MET CYS MET SER SER TRP  
 35                      40                      45  
 LYS LEU ALA MET GLU GLY GLU ASP HIS LYS LYS THR PRO ASP ASP LEU  
 50                      55                      60  
 ALA HIS ASN PRO ALA VAL LEU GLY HIS GLU PHE SER GLY LYS ILE LEU  
 65                      70                      75                      80  
 LYS VAL GLY LYS LYS TRP GLN SER LYS PHE HIS ALA GLY GLN ASN TYR  
 85                      90                      95  
 VAL ILE GLN PRO ASN LEU ALA ARG GLN ASN THR PRO PHE VAL PRO GLY  
 100                      105                      110  
 TYR SER TYR PRO TYR ILE GLY ASP ALA THR LYS ILE ILE ILE PRO  
 115                      120                      125  
 ASP GLU VAL MET THR MET GLY CYS LEU ILE PRO PHE GLU GLY ASP ALA  
 130                      135                      140  
 TYR TYR GLU GLY SER LEU CYS GLU PRO VAL SER CYS VAL ILE ALA ALA  
 145                      150                      155                      160  
 PHE ARG ALA GLN TYR HIS VAL ASN PHE HIS SER TYR GLN PRO THR THR  
 165                      170                      175  
 GLY ILE LYS GLU GLY GLY ASN MET LEU ILE MET GLY GLY THR GLY PRO  
 180                      185                      190  
 MET GLY LEU LEU ALA ILE ASP TYR ALA LEU HIS GLY PRO LYS LYS PRO  
 195                      200                      205  
 SER THR LEU VAL VAL THR ASP VAL ASN GLN ALA LYS LEU ASP ARG ALA  
 210                      215                      220  
 LYS LYS LEU TYR PRO SER ASP TRP VAL ASP ILE LYS PHE VAL ASN VAL  
 225                      230                      235                      240  
 ASN ASN LEU SER LEU ASP GLU GLN LYS GLU VAL LEU LEU ASP ALA VAL  
 245                      250                      255  
 ASP GLY ASN GLY TYR ASP ASP ALA PHE LEU MET ILE SER VAL ALA PRO  
 260                      265                      270  
 LEU ALA THR LEU ALA ASP SER LEU LEU ASN PRO ASP GLY CYS LEU ASN  
 275                      280                      285  
 GLN PHE ALA GLY PRO MET LYS LYS ASP PHE SER ALA SER VAL ASN PHE  
 290                      295                      300  
 TYR ASN ILE HIS TYR ASN PHE THR HIS PHE VAL GLY THR SER GLY GLY  
 305                      310                      315                      320  
 ASP ALA ASP ASN GLU ALA GLU ALA ALA LYS LEU ILE ALA GLU LYS LYS  
 325                      330                      335  
 LEU ASP VAL SER LYS VAL ILE THR HIS VAL MET GLY LEU ASN ASP ALA  
 340                      345                      350  
 ALA GLU THR THR MET ASN GLN PRO GLU ILE GLY GLY GLY LYS LYS LEU

355                      360                      365  
 VAL TYR SER GLY LYS LYS PHE ASP ARG ILE GLU LEU ALA LYS VAL ASP  
 370                      375                      380  
 PRO THR THR ASP LEU GLY LYS ILE LEU ALA LYS HIS ASP GLY LEU TRP  
 385                      390                      395                      400  
 SER LYS GLU ALA GLU ASP TRP ILE LEU THR ASN GLU PRO ASP TYR ASP  
 405                      410                      415  
 ALA

<210> 127  
 <211> 279  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 127  
 MET PHE ASP GLU GLU ALA LEU THR MET SER LEU LEU TYR PRO LYS GLN

1                      5                      10                      15  
 ASN GLN GLU ILE GLN PRO GLY VAL HIS LEU ILE GLN ASP VAL ASN ALA  
 20                      25                      30  
 THR ASN SER PRO MET LYS TYR THR ALA VAL LYS VAL LEU GLU LEU ASP  
 35                      40                      45  
 ALA GLN ARG SER PHE ALA GLU THR LEU GLY ASN PHE GLU ALA GLY ILE  
 50                      55                      60  
 VAL ILE LEU ALA GLY LYS VAL THR VAL THR ALA GLY ASP GLN ARG PHE  
 65                      70                      75                      80  
 GLU GLY ILE GLY GLN ARG GLN SER VAL PHE ASP LYS ILE PRO THR ASP  
 85                      90                      95  
 SER VAL TYR VAL GLY THR GLY LEU SER PHE LYS LEU ALA ALA GLN THR  
 100                      105                      110  
 THR ALA LYS VAL LEU ILE ALA TYR SER PRO THR THR THR SER PHE PRO  
 115                      120                      125  
 VAL ARG LEU ILE LYS GLY ASP ILE HIS GLN ILE GLU HIS ARG GLY ARG  
 130                      135                      140  
 TYR GLN ASN LYS ARG LEU VAL GLN ASN ILE LEU PRO ASP ASP LEU PRO  
 145                      150                      155                      160  
 PHE ALA ASP LYS LEU LEU LEU VAL GLU VAL TYR THR ASP SER GLY ASN  
 165                      170                      175  
 TRP SER SER TYR PRO PRO HIS ARG HIS ASP HIS ASP ASN LEU PRO THR  
 180                      185                      190  
 GLU SER LEU LEU GLU GLU ILE TYR TYR HIS GLU MET GLN PRO LYS GLN  
 195                      200                      205  
 GLY PHE VAL PHE GLN ARG VAL TYR THR ASP ASP LEU SER LEU ASN GLU  
 210                      215                      220  
 THR MET ALA VAL GLN ASN GLN ASP VAL VAL ILE VAL PRO LYS GLY TYR  
 225                      230                      235                      240  
 HIS PRO VAL GLY VAL PRO ASP GLY TYR ASP SER TYR TYR LEU ASN ILE  
 245                      250                      255  
 MET ALA GLY PRO ILE ARG VAL TRP HIS PHE HIS ASN ALA PRO GLU HIS  
 260                      265                      270  
 ALA TRP ILE ILE ASP ARG LYS  
 275

<210> 128  
 <211> 324  
 <212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 128

MET SER GLN LYS PHE ASP LEU ILE ALA ILE GLY ARG ALA ALA VAL ASP  
1 5 10 15  
LEU ASN ALA VAL GLU TYR ASN ARG PRO LEU GLU GLU THR LYS SER PHE  
20 25 30  
ALA LYS PHE VAL GLY GLY SER PRO ALA ASN ILE ALA ILE GLY SER ALA  
35 40 45  
LYS LEU GLY GLN LYS VAL GLY PHE ILE GLY LYS VAL SER ASP ASP GLN  
50 55 60  
LEU GLY HIS TYR VAL THR GLN TYR MET ALA ASP VAL GLY ILE ASP THR  
65 70 75 80  
THR GLN MET VAL LYS ASP ASP ALA GLY HIS LYS ILE GLY LEU THR PHE  
85 90 95  
THR GLU ILE ILE SER PRO GLU GLU SER ASP ILE LEU MET TYR ARG ASN  
100 105 110  
GLU ALA ALA ASP LEU TYR LEU THR THR ALA ASP VAL SER GLU GLU TYR  
115 120 125  
LEU ALA GLN ALA LYS MET LEU VAL ILE SER GLY THR GLY LEU ALA GLN  
130 135 140  
SER PRO SER ARG GLU ALA ILE LEU LYS ALA LEU THR VAL ALA LYS SER  
145 150 155 160  
LEU GLY VAL GLU VAL VAL PHE GLU LEU ASP TYR ARG PRO TYR THR TRP  
165 170 175  
LYS ASN ALA GLU GLU THR SER LEU TYR TYR GLN LEU VAL ALA GLN ARG  
180 185 190  
ALA ASP VAL ILE ILE GLY THR ARG ASP GLU PHE ASP VAL LEU GLU ASN  
195 200 205  
HIS HIS GLY ASN THR ASN GLU GLN THR ILE ALA THR LEU PHE LYS TYR  
210 215 220  
ASP PRO LYS LEU ILE VAL ILE LYS SER GLY VAL GLN GLY SER ASN ALA  
225 230 235 240  
TYR THR LYS ALA GLY ASP HIS TYR HIS PHE GLY VAL PHE LYS THR LYS  
245 250 255  
VAL LEU LYS SER PHE GLY ALA GLY ASP SER PHE ALA ALA GLY PHE LEU  
260 265 270  
TYR ALA TYR SER HIS ASP LEU GLY ILE GLU THR ALA LEU LYS TYR GLY  
275 280 285  
SER ALA ALA ALA SER ILE VAL ILE SER GLN LEU SER SER SER GLU ALA  
290 295 300  
MET PRO ASP LEU ALA LYS LEU THR ALA PHE ILE HIS GLU ALA GLU ARG  
305 310 315 320  
GLN GLU VAL HIS

<210> 129

<211> 282

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 129

MET PRO ASP LEU GLY LYS GLU VAL THR PHE GLU GLN ALA ILE ASP GLU  
1 5 10 15  
MET ALA LEU ALA GLY TYR GLN GLY THR GLU VAL GLY ASN LYS TYR PRO  
20 25 30  
LYS ASP PRO VAL VAL LEU LYS HIS TYR LEU ASP LEU ARG HIS LEU LYS

35 40 45  
 ILE ALA SER ALA TRP PHE SER ALA PHE LEU THR THR LYS PRO TYR GLU  
 50 55 60  
 GLU THR GLU ALA ALA PHE ILE LYS HIS ARG ASP PHE LEU HIS ALA MET  
 65 70 75 80  
 GLY ALA LYS VAL ILE VAL VAL ALA GLU GLN GLY HIS SER VAL GLN GLY  
 85 90 95  
 MET LEU ASP LYS SER VAL PHE ASP ASP LYS PRO HIS PHE THR ASP GLU  
 100 105 110  
 GLU TRP GLN ARG LEU ALA THR GLY LEU GLU ARG LEU GLY ASP ARG ALA  
 115 120 125  
 HIS GLU VAL GLY MET GLN ILE VAL TYR HIS HIS HIS MET GLY THR GLY  
 130 135 140  
 VAL GLN THR THR ALA GLU ILE ASP LYS LEU MET ALA MET THR ASP PRO  
 145 150 155 160  
 ASP LYS VAL SER LEU LEU PHE ASP THR GLY HIS LEU VAL LEU SER GLY  
 165 170 175  
 GLU ASP PRO LEU THR ILE PHE ASP ARG TYR TYR ASP ARG ILE LYS HIS  
 180 185 190  
 ILE HIS PHE LYS ASP VAL ARG PRO GLU GLN ALA GLN GLN GLU ARG THR  
 195 200 205  
 ASP HIS LEU SER PHE LEU GLN GLY VAL LYS ASN GLY MET PHE THR VAL  
 210 215 220  
 PRO GLY ASP GLY MET ILE ASP PHE LYS PRO ILE TRP GLU ALA ILE GLN  
 225 230 235 240  
 LYS GLN HIS TYR ASP GLY TRP ILE VAL VAL GLU ALA GLU GLN ASP PRO  
 245 250 255  
 ALA LYS ALA ASN PRO PHE GLU TYR ALA LEU LYS ALA LYS HIS TYR LEU  
 260 265 270  
 ASP THR ILE MET THR ILE PRO GLN ALA VAL  
 275 280

<210> 130

<211> 346

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 130

MET VAL VAL LYS VAL GLY VAL ILE GLY THR GLY ALA MET GLY ARG ALA  
 1 5 10 15  
 HIS ILE ASP ARG LEU THR ASN VAL LEU THR GLY ALA GLU VAL ILE ALA  
 20 25 30  
 VAL THR ASP ILE ASP GLN GLU ALA ALA GLN ALA ALA VAL ARG ASP PHE  
 35 40 45  
 LYS LEU ASN ALA LYS VAL TYR PRO ASP ASP THR SER LEU LEU LYS ASP  
 50 55 60  
 PRO ASP ILE ASP ALA VAL PHE VAL VAL SER PHE GLY GLY ALA HIS GLU  
 65 70 75 80  
 ALA THR ILE LEU LYS ALA LEU ASP THR ASP LYS PHE ILE PHE THR GLU  
 85 90 95  
 LYS PRO LEU ALA THR THR LEU GLU GLY ALA LYS ARG ILE VAL ASP LYS  
 100 105 110  
 GLU ILE GLY LYS PRO ARG LYS VAL ILE GLN VAL GLY PHE MET ARG ARG  
 115 120 125  
 TYR ASP GLU GLY ILE HIS ALA LEU LYS THR LYS LEU ASP SER GLY ILE  
 130 135 140



ILE GLY THR PRO LEU VAL VAL ARG ALA SER HIS ILE ASN PRO ASN VAL  
 145 150 155 160  
 ALA ALA ASN TYR SER ASN GLU MET ALA ILE THR ASP THR LEU ILE HIS  
 165 170 175  
 GLU ILE ASP GLU MET HIS TRP LEU LEU ASP ASP ASP TYR ALA SER ILE  
 180 185 190  
 GLN ILE THR TYR PRO ARG GLN SER SER GLN VAL THR ASN GLU GLY LEU  
 195 200 205  
 ARG ASP PRO GLN LEU ALA THR LEU THR THR LYS LYS GLY THR VAL ILE  
 210 215 220  
 GLN VAL LEU VAL HIS VAL THR ALA GLN TYR GLY TYR GLU VAL LYS LEU  
 225 230 235 240  
 GLU VAL VAL GLY GLU THR GLY GLU LEU LYS LEU PRO ASP TYR GLY PHE  
 245 250 255  
 GLU PRO ILE VAL ARG THR GLN ALA THR GLN GLN THR ALA MET GLU THR  
 260 265 270  
 SER TRP VAL ASN ARG PHE LEU GLN ALA TYR ASN THR GLU VAL GLN GLU  
 275 280 285  
 PHE ILE ASP HIS VAL ALA LYS ASP GLN SER PRO VAL GLY PRO SER ALA  
 290 295 300  
 TRP ASP GLY TYR VAL ALA ALA VAL THR ALA GLU ALA ALA ILE ARG SER  
 305 310 315 320  
 GLN LYS ASP GLN GLU PRO VAL LEU ILE ASN VAL ALA GLU THR PRO THR  
 325 330 335  
 PHE TYR GLN THR ASN GLN PRO VAL LYS ALA  
 340 345

<210> 131

<211> 290

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 131

MET ALA LEU ILE PRO ALA THR LYS LEU ILE GLN ALA ALA LEU ALA ASP  
 1 5 10 15  
 HIS ALA ALA ILE GLY HIS PHE ASN ILE ASN GLY ALA ASP TRP LEU GLU  
 20 25 30  
 THR TYR LEU LYS VAL ALA GLN LYS THR GLY THR PRO ILE ILE VAL ALA  
 35 40 45  
 THR SER ASP ARG ILE ILE ASP PHE LEU GLY GLY PHE ASP PHE ILE ALA  
 50 55 60  
 GLY TYR VAL ARG PHE MET VAL GLN ALA LEU HIS ILE THR ALA PRO VAL  
 65 70 75 80  
 VAL LEU HIS LEU ASP HIS GLY LEU SER VAL GLU HIS VAL TYR GLN ALA  
 85 90 95  
 ILE ASP ALA GLY TYR THR SER VAL MET PHE ASP GLY SER LYS LEU PRO  
 100 105 110  
 ILE GLU GLU ASN VAL ALA LEU THR ASP GLU VAL VAL ARG TYR ALA HIS  
 115 120 125  
 GLN HIS HIS VAL SER VAL GLU ALA GLU VAL GLY SER VAL GLY GLY ASN  
 130 135 140  
 GLU ASN GLY LEU ILE ASN GLY ILE ARG TYR ALA SER VAL THR ASP ALA  
 145 150 155 160  
 VAL LYS MET ALA ALA THR GLY ILE ASP ALA LEU ALA ALA ALA LEU GLY  
 165 170 175  
 SER VAL HIS GLY ASP TYR VAL GLY ARG PRO ASN LEU ASN PHE GLU ARG  
 180 185 190

MET ALA ALA ILE ALA ALA ALA THR LYS LEU PRO LEU VAL LEU HIS GLY  
 195 200 205  
 ALA SER GLY ILE PRO ASP ASP GLN ILE GLN GLN ALA ILE GLN THR GLY  
 210 215 220  
 THR ALA LYS ILE ASN ILE ASN THR GLU VAL ASN THR VAL TRP THR ALA  
 225 230 235 240  
 ALA ILE THR LYS ALA VAL GLN ALA LYS ARG SER GLY HIS ASP PRO GLN  
 245 250 255  
 PRO ILE LEU LEU ALA GLY LYS LYS ALA ILE ALA GLN LEU VAL GLU THR  
 260 265 270  
 LYS MET LYS ALA PHE HIS ILE LEU GLY LYS SER LYS ARG SER VAL THR  
 275 280 285  
 PHE GLU  
 290

<210> 132

<211> 555

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 132

MET SER GLU ALA THR TYR THR PRO VAL SER ASN ARG THR ARG PHE PRO  
 1 5 10 15  
 LEU ILE THR ARG SER PRO ALA GLN LYS SER ALA CYS LYS ASP LEU SER  
 20 25 30  
 ARG ASN GLY GLN ARG ALA ALA HIS HIS ARG LEU ARG PRO THR TYR THR  
 35 40 45  
 ARG ILE SER LYS ARG ALA GLY SER ARG SER LEU TYR LYS GLY VAL VAL  
 50 55 60  
 PHE MET GLN ARG ASN LYS GLN LEU ARG PRO GLU ASN PHE ILE ASN GLY  
 65 70 75 80  
 GLN TRP VAL ASP ALA LYS THR ASP THR PHE GLU ASP VAL TYR ASN PRO  
 85 90 95  
 PRO THR GLY GLU VAL LEU ALA ARG VAL PRO HIS SER THR SER GLU ASP  
 100 105 110  
 VAL ALA ASP ALA VAL ALA ALA ALA LYS ALA ALA PHE GLU THR TRP LYS  
 115 120 125  
 ARG VAL SER ILE PRO LYS ARG ALA LYS ILE LEU PHE LYS TYR GLN GLN  
 130 135 140  
 LEU LEU VAL GLU HIS GLN GLU GLU LEU GLY ARG ILE VAL THR GLN GLU  
 145 150 155 160  
 ASN GLY LYS SER LEU SER GLU ALA ILE ALA GLU VAL GLY ARG GLY ILE  
 165 170 175  
 GLU ASN VAL GLU PHE ALA ALA GLY VAL PRO THR LEU MET MET GLY ASP  
 180 185 190  
 SER LEU SER ALA VAL ALA THR ASP VAL GLU ALA THR ASN TYR ARG TYR  
 195 200 205  
 PRO ILE GLY VAL VAL GLY GLY ILE THR PRO PHE ASN PHE PRO MET MET  
 210 215 220  
 VAL PRO CYS TRP MET PHE PRO MET ALA VAL ALA THR GLY ASN THR PHE  
 225 230 235 240  
 VAL LEU LYS PRO SER GLU LYS THR PRO LEU THR SER GLN ARG LEU VAL  
 245 250 255  
 GLU LEU PHE GLN GLU ALA GLY LEU PRO ASP GLY VAL LEU ASN ILE VAL  
 260 265 270  
 ASN GLY ALA ASP ASP VAL VAL ASN GLY LEU LEU ASP HIS PRO ASP VAL  
 275 280 285

LYS ALA ILE SER PHE VAL GLY SER GLU ARG VAL GLY GLU TYR VAL TYR  
 290 295 300  
 LYS ARG GLY SER ASP HIS LEU LYS ARG VAL GLN ALA LEU THR GLY ALA  
 305 310 315 320  
 LYS ASN HIS THR ILE VAL LEU ALA ASP LEU ASP ALA ALA VAL  
 325 330 335  
 LYS GLY ILE ILE SER SER SER PHE GLY SER ALA GLY GLU ARG CYS MET  
 340 345 350  
 ALA THR SER VAL LEU VAL LEU GLU GLU SER ILE ALA ASP LYS PHE MET  
 355 360 365  
 ALA LYS PHE THR GLN ALA ALA LYS ASP ILE LYS ILE GLY ASN GLY LEU  
 370 375 380  
 ASP LYS ASP VAL PHE LEU GLY PRO VAL ILE ARG GLN GLU ASN GLN GLU  
 385 390 395 400  
 ARG THR LEU ASN TYR ILE LYS THR GLY VAL LYS GLU GLY ALA LYS LEU  
 405 410 415  
 VAL LEU ASP GLY SER ALA GLU ALA GLU LYS ARG ASP GLY TYR PHE VAL  
 420 425 430  
 GLY PRO THR ILE PHE GLU ASP VAL LYS THR ASP MET THR ILE TRP HIS  
 435 440 445  
 ASP GLU MET PHE ALA PRO VAL LEU SER VAL MET ARG ALA LYS ASP LEU  
 450 455 460  
 PRO GLU ALA VAL ALA ILE ALA ASN GLN SER GLU LEU ALA ASN GLY ALA  
 465 470 475 480  
 CYS LEU PHE THR ASP SER ALA ALA SER ILE ARG TYR PHE ARG GLU ASN  
 485 490 495  
 ILE ASP ALA GLY MET LEU GLY ILE ASN LEU GLY VAL LEU ALA PRO ILE  
 500 505 510  
 ALA VAL PHE PRO PHE SER GLY TRP LYS HIS SER PHE PHE GLY THR LEU  
 515 520 525  
 HIS ALA ASN GLY LYS ASP SER VAL ASP PHE TYR THR HIS LYS LYS VAL  
 530 535 540  
 VAL THR ALA ARG TYR ASP GLN HIS ARG PHE ASN  
 545 550 555

<210> 133

<211> 252

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 133

MET LEU THR LYS ARG ILE ILE PRO CYS LEU ASP VAL ASP GLN GLY ARG  
 1 5 10 15  
 VAL LYS LYS GLY VAL HIS PHE ILE GLN LEU LYS ASP VAL GLY ASP PRO  
 20 25 30  
 VAL ALA ILE ALA LYS ALA TYR GLU ALA GLN GLY ALA ASP GLU LEU VAL  
 35 40 45  
 PHE LEU ASP ILE THR ALA THR THR ASP ALA ARG GLN THR MET THR GLN  
 50 55 60  
 THR VAL ALA ALA VAL ALA THR GLN VAL PHE MET PRO LEU THR VAL GLY  
 65 70 75 80  
 GLY GLY ILE ARG SER VAL THR ASP MET HIS GLN LEU LEU ARG ALA GLY  
 85 90 95  
 ALA ASP LYS ILE ALA LEU ASN SER ALA ALA VAL LYS HIS PRO ASP LEU  
 100 105 110  
 ILE THR ALA GLY ALA GLU LYS PHE GLY ARG GLN ALA ILE VAL VAL ALA  
 115 120 125

ILE ASP ALA ARG TRP GLN PRO SER ARG ASN ARG TYR GLN VAL MET ILE  
 130 135 140  
 ASN GLY GLY ARG THR PRO VAL ASP LEU GLY VAL LEU THR TRP ALA GLN  
 145 150 155 160  
 GLN ALA VAL ALA ALA GLY ALA GLY GLU LEU LEU ILE THR SER MET ASP  
 165 170 175  
 ALA ASP GLY THR LYS GLN GLY PHE ASP LEU ARG LEU TYR GLN GLN LEU  
 180 185 190  
 SER SER ILE VAL THR VAL PRO VAL VAL ALA SER GLY GLY ALA GLY SER  
 195 200 205  
 ALA ASN ASP PHE VAL ALA LEU PHE ARG ASN THR ASN VAL SER ALA GLY  
 210 215 220  
 LEU ALA ALA SER ILE PHE HIS PHE GLY GLU LEU THR ILE PRO GLN VAL  
 225 230 235 240  
 LYS THR VAL LEU LYS GLN ALA LYS VAL ALA ILE ARG  
 245 250

<210> 134  
 <211> 194  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 134  
 MET LYS ARG LYS PRO ILE ARG ILE ARG PRO PHE GLN ARG PRO ILE PRO  
 1 5 10 15  
 SER VAL ALA THR CYS TRP THR THR SER VAL LYS LEU PRO VAL ALA SER  
 20 25 30  
 ILE LEU PRO ASN ASP ARG ASN PRO ARG MET ILE LYS ILE THR LEU ASP  
 35 40 45  
 ILE ILE ILE ALA LYS GLU LEU VAL VAL ILE MET PRO LYS VAL TYR PHE  
 50 55 60  
 LEU CYS THR GLY ASN ALA CYS ARG SER GLN MET ALA GLU GLY PHE ALA  
 65 70 75 80  
 LYS LYS LEU LEU GLY ARG GLN TRP GLN VAL LYS SER ALA GLY ILE GLU  
 85 90 95  
 ALA HIS GLY LEU ASN PRO LEU ALA VAL LYS VAL MET ALA GLU LYS GLY  
 100 105 110  
 ILE ASP ILE SER GLN GLN GLN SER LYS VAL LEU LYS GLU ALA GLU LEU  
 115 120 125  
 GLN GLN ALA ASP LEU ILE VAL THR LEU CYS GLY ASP ALA ARG ASP ARG  
 130 135 140  
 CYS PRO VAL THR PRO PRO THR VAL ARG ARG LEU HIS TRP PRO LEU ALA  
 145 150 155 160  
 ASP PRO ALA ALA ALA SER GLY SER GLN GLU ALA VAL LEU ALA VAL PHE  
 165 170 175  
 ARG GLN VAL ARG ASP GLN ILE GLU ALA HIS VAL ARG ALA LEU LYS ALA  
 180 185 190  
 ASP ALA

<210> 135  
 <211> 163  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 135  
 ILE LYS ILE ILE ASP LYS ILE GLU LYS THR SER VAL SER GLY THR LYS

1                    5                    10                    15  
 THR TRP ARG ASP ASN ASN ASN GLN ASP GLY ILE ARG PRO SER SER ILE  
                   20                    25                    30  
 THR VAL ASN SER LEU ALA ASN GLY GLN GLN VAL ALA SER LYS LYS VAL  
                   35                    40                    45  
 THR ALA SER ASP ASN TRP GLN TYR SER PHE ASP ASN LEU ALA ALA TYR  
                   50                    55                    60  
 ALA ASN GLY GLN LYS ILE THR TYR THR VAL THR GLU ASP ALA VAL ALA  
 65                    70                    75                    80  
 GLY TYR THR SER THR VAL ASP GLY TYR ASN ILE THR ASN THR HIS ASN  
                   85                    90                    95  
 PRO THR THR PRO LYS LYS PRO GLN VAL PRO ASN ASN PRO THR THR PRO  
                   100                    105                    110  
 LYS GLU PRO GLN VAL PRO ASN ASN GLY ASN LYS VAL THR PRO LYS ASP  
                   115                    120                    125  
 PHE THR GLN GLY LYS MET TYR ASP LYS THR SER ARG LEU PRO GLN THR  
                   130                    135                    140  
 GLY ASP GLY SER SER MET GLY MET MET LEU ILE GLY LEU VAL PRO LEU  
 145                    150                    155                    160  
 LEU LEU SER

<210> 136  
 <211> 197  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 136  
 MET ARG GLY TYR ILE PHE ILE HIS CYS LYS GLN GLU GLN GLN GLY TRP  
 1                    5                    10                    15  
 ARG LEU ILE ARG LEU SER PRO SER GLY PRO ARG GLY ALA PHE PRO HIS  
                   20                    25                    30  
 GLY ARG PRO SER GLU ARG ILE LEU GLN GLU ASN GLU LEU ILE THR ILE  
                   35                    40                    45  
 ASP PHE GLY ILE VAL LEU ALA ASP TYR GLN SER ASP MET THR ARG THR  
                   50                    55                    60  
 LEU SER ILE GLY LYS PRO PRO ALA GLU LEU ALA ALA VAL HIS ALA ALA  
 65                    70                    75                    80  
 VAL LEU ASP ALA GLN GLN THR ALA ILE ALA ALA LEU LYS PRO GLY MET  
                   85                    90                    95  
 GLN GLY ARG GLU VAL ASP ALA ILE VAL ARG GLY VAL LEU THR ALA ALA  
                   100                    105                    110  
 GLY TYR GLY ASP CYS PHE THR HIS GLY LEU GLY HIS GLY LEU GLY LEU  
                   115                    120                    125  
 GLY GLY ASP GLN PRO ILE LEU ASN PRO ARG SER GLN THR VAL LEU ALA  
                   130                    135                    140  
 PRO GLY MET ILE VAL THR ILE GLU PRO GLY ALA TYR LEU PRO GLY ILE  
 145                    150                    155                    160  
 GLY GLY VAL ARG ILE GLU ASP ASP VAL VAL ILE THR GLU THR GLY ALA  
                   165                    170                    175  
 ARG VAL LEU ASN GLN THR SER ARG GLN MET ASN GLN LEU GLU VAL LEU  
                   180                    185                    190  
 GLU HIS GLU PRO ILE

195

<210> 137

<211> 407  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 137

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MET THR GLU LYS ILE VAL LEU ALA TYR SER GLY GLY LEU ASP THR SER
 1           5           10          15
VAL ALA ILE PRO TRP LEU MET ASP LYS GLY TYR GLU MET ILE ALA VAL
 20          25          30
VAL LEU ASN VAL GLY GLN PRO GLY MET ARG ILE LEU THR ARG ILE ASN
 35          40          45
LYS LYS ARG LEU LYS VAL GLY ALA ILE ASP SER ILE VAL ILE ASP ALA
 50          55          60
GLN ASN GLU PHE GLY ASP HIS TYR VAL ALA PRO VAL ILE LYS ALA ASN
 65          70          75          80
ALA LEU TYR GLU GLY ASP TYR PRO LEU VAL SER ALA LEU SER ARG PRO
 85          90          95
LEU ILE ILE GLU HIS LEU VAL LYS ILE ALA HIS ALA GLN ASN ALA THR
100         105         110
ALA ILE ALA HIS GLY SER THR GLY LYS GLY ASN ASP GLN VAL ARG PHE
115         120         125
GLU ALA ALA ILE HIS ALA LEU ASP PRO GLU MET LYS ILE GLU ALA PRO
130         135         140
ILE ARG ASP PHE HIS TRP SER ARG GLU GLU ILE ASP TYR ALA LYS
145         150         155         160
ASP HIS HIS VAL PRO VAL PRO ILE GLY LYS LYS SER PRO TYR SER ILE
165         170         175
ASP ALA ASN LEU TRP GLY ARG ALA ASN GLU ALA GLY ILE LEU GLU ASN
180         185         190
PRO TRP ASN GLN ALA PRO ASP ASP ALA TRP GLY MET THR VAL ALA PRO
195         200         205
GLU ALA ALA PRO ASP LYS PRO THR PHE LEU ASP LEU THR PHE GLN GLN
210         215         220
GLY VAL PRO VAL ALA LEU ASN GLY ASN PRO MET PRO LEU ALA ALA MET
225         230         235         240
ILE LYS GLN LEU ASN GLN ILE ALA GLY ALA ASN GLY ILE GLY ARG ILE
245         250         255
ASP LYS ILE GLU ASN ARG LEU VAL GLY ILE LYS SER ARG GLU VAL TYR
260         265         270
GLU ALA PRO ALA ALA ALA VAL ILE MET THR ALA HIS HIS ASP LEU GLU
275         280         285
ASN LEU THR LEU GLU ARG ASP VAL GLN HIS PHE LYS PRO THR ILE GLU
290         295         300
ASN LYS LEU THR ASN MET ILE TYR GLU ALA GLN TRP ILE SER PRO LEU
305         310         315         320
PHE ASP ALA LEU MET ALA PHE ILE ASP LYS THR GLN ALA VAL VAL ASN
325         330         335
GLY THR VAL LYS MET LYS LEU TYR LYS GLY SER ALA VAL PRO VAL ALA
340         345         350
ARG GLN SER THR HIS ASN SER LEU TYR ASP GLU ASP LEU ALA THR TYR
355         360         365
THR SER ALA ASP SER PHE ASP GLN GLU ALA ALA ALA GLY PHE ILE LYS
370         375         380
LEU TRP THR LEU PRO THR THR VAL PHE GLU GLN VAL ASN HIS VAL HIS
385         390         395         400
SER GLU GLU LYS GLN HIS ASP
405

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<210> 138  
 <211> 473  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 138

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MET THR ASP LYS LEU TRP GLY GLY ARG PHE THR GLU LYS ALA ALA HIS
 1             5             10            15
TRP VAL ASP ALA PHE GLY ALA SER ILE SER PHE ASP GLN GLN MET ALA
      20             25             30
LYS GLU ASP LEU GLU GLY SER LEU ALA HIS VAL LYS MET LEU GLY LYS
      35             40             45
THR GLY ILE ILE PRO GLN ALA ASP ALA ASP THR ILE THR ALA GLY LEU
      50             55             60
HIS HIS LEU GLN LYS GLU LEU ALA ALA GLY LYS LEU HIS PHE THR VAL
      65             70             75             80
GLU ASN GLU ASP ILE HIS LEU ASN MET GLU ALA LEU LEU THR ALA GLU
      85             90             95
ILE GLY PRO GLN PRO LYS SER GLY PRO VAL ALA GLY LYS LEU HIS THR
      100            105            110
ALA ARG SER ARG ASN ASP GLN VAL ALA THR ALA LEU HIS LEU TRP LEU
      115            120            125
LYS HIS ARG LEU PRO ALA ILE LYS GLU ALA LEU THR ASN LEU GLN THR
      130            135            140
VAL LEU VAL GLY GLN ALA LYS ALA HIS ALA ALA THR ILE MET PRO GLY
      145            150            155            160
TYR THR HIS MET GLN HIS ALA GLN PRO ILE THR TYR GLY HIS TYR LEU
      165            170            175
LEU ALA TYR PHE GLU MET PHE GLN ARG ASP TRP GLU ARG PHE ASP PHE
      180            185            190
THR GLN LYS HIS THR ASP ILE LEU PRO LEU GLY ALA ALA ALA LEU ALA
      195            200            205
GLY THR THR PHE PRO ILE ASP ARG GLU LEU VAL ALA GLN GLU LEU GLY
      210            215            220
PHE ASP GLN LEU TYR HIS ASN SER LEU ASP ALA VAL SER ASP ARG ASP
      225            230            235            240
PHE ALA LEU GLU PHE LEU SER ASN SER ALA ILE LEU MET GLN HIS LEU
      245            250            255
SER ARG MET ALA GLU GLU LEU ILE LEU TRP SER THR PHE GLU PHE ASN
      260            265            270
TYR ILE GLU LEU GLY ASP ASP PHE SER THR GLY SER SER ILE MET PRO
      275            280            285
GLN LYS LYS ASN PRO ASP PHE ALA GLU LEU ILE ARG GLY LYS THR GLY
      290            295            300
ARG VAL TYR GLY ALA LEU MET GLY LEU LEU THR THR MET LYS ALA ILE
      305            310            315            320
PRO LEU ALA TYR ASN LYS ASP MET GLN GLU ASP LYS GLU PRO ILE PHE
      325            330            335
ASP ALA TYR ASN THR ILE LEU GLY SER LEU HIS ILE PHE THR GLY MET
      340            345            350
LEU SER ASP LEU THR VAL HIS GLU GLN ARG MET ALA ALA ALA THR THR
      355            360            365
HIS ASP PHE SER ASN ALA THR GLU LEU ALA ASP TYR LEU ALA THR LYS
      370            375            380
GLY VAL PRO PHE ARG GLN ALA HIS ALA ILE VAL GLY GLU LEU VAL LEU
      385            390            395            400

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LYS GLY ILE LYS THR GLY THR ALA LEU GLN GLU MET PRO LEU SER GLU  
                   405                  410                  415  
 LEU GLN GLU ALA ALA PRO GLN ILE GLN GLU ASP VAL TYR ALA GLU LEU  
                   420                  425                  430  
 THR SER LYS ALA ALA VAL ASN ARG ARG THR SER LEU GLY GLY THR ALA  
                   435                  440                  445  
 VAL SER ASN VAL LEU LYS GLU VAL ALA ARG ASP GLU LYS ILE ILE ALA  
                   450                  455                  460  
 ASP HIS GLU ASN ALA ALA PRO SER MET  
 465                  470

<210> 139  
 <211> 738  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 139  
 VAL THR HIS VAL GLU MET SER PRO GLU ALA ILE ALA GLU LYS LYS PRO  
 1                  5                  10                  15  
 TYR LEU ALA LEU GLY LEU THR GLU ASP GLU TYR HIS ARG PHE ALA GLU  
                   20                  25                  30  
 LEU ILE GLY HIS GLN PRO ASN ASP THR GLU ILE GLY LEU ALA SER GLY  
                   35                  40                  45  
 MET TRP SER GLU HIS CYS ALA TYR LYS TYR SER LYS PRO ILE LEU ARG  
                   50                  55                  60  
 GLN PHE TRP THR LYS ASN ASP ARG VAL LEU MET GLY PRO GLY GLU GLY  
 65                  70                  75                  80  
 ALA GLY VAL ILE ASP ILE GLY GLU GLY LYS ALA VAL VAL PHE LYS ALA  
                   85                  90                  95  
 GLU SER HIS ASN HIS PRO SER ALA VAL GLU PRO TYR GLU GLY ALA ALA  
                   100                  105                  110  
 THR GLY VAL GLY GLY ILE ILE ARG ASP ILE PHE SER ILE GLY ALA LYS  
                   115                  120                  125  
 PRO VAL ALA MET LEU ASP SER LEU ALA PHE GLY ASP LEU ASN LEU PRO  
                   130                  135                  140  
 HIS THR GLN HIS LEU VAL ASP ARG ILE VAL ALA GLY ILE GLY GLY TYR  
 145                  150                  155                  160  
 GLY ASN ALA ILE GLY ILE PRO THR VAL GLY GLY GLU THR ASN PHE ASP  
                   165                  170                  175  
 HIS THR TYR ALA ARG ASN PRO LEU VAL ASN ALA MET CYS VAL GLY ILE  
                   180                  185                  190  
 MET ASP LYS ASP GLN ILE GLN LYS GLY LYS ALA ALA GLY VAL GLY ASN  
                   195                  200                  205  
 ALA LEU ILE TYR VAL GLY ALA LYS THR GLY ARG ASP GLY ILE ASN GLY  
                   210                  215                  220  
 ALA SER PHE ALA SER GLY ASP PHE SER ASP GLU GLU ALA ALA ASP ARG  
 225                  230                  235                  240  
 SER ALA VAL GLN VAL GLY ASP PRO PHE MET GLU LYS LEU LEU MET ASP  
                   245                  250                  255  
 ALA CYS LEU GLU ILE THR GLN ASP HIS GLN GLN ALA LEU VAL GLY ILE  
                   260                  265                  270  
 GLN ASP MET GLY ALA ALA GLY LEU VAL SER SER SER VAL GLU MET ALA  
                   275                  280                  285  
 GLY LYS ALA ASN SER GLY MET GLU MET ASP LEU ASP LEU ILE PRO GLN  
                   290                  295                  300  
 ARG GLU ALA ASN MET THR PRO PHE GLU ILE MET LEU SER GLU SER GLN  
 305                  310                  315                  320



GLU ARG MET LEU LEU CYS VAL ARG ALA GLY PHE GLU GLN GLU VAL LEU  
 325 330 335  
 ASP VAL PHE ALA ALA TYR ASP LEU ASP ALA ALA VAL VAL GLY HIS VAL  
 340 345 350  
 ILE GLU GLY HIS GLN TYR ARG LEU TYR HIS HIS GLY LYS LEU VAL CYS  
 355 360 365  
 ASP VAL PRO VAL SER SER LEU THR ASP ASP ALA PRO ILE TYR GLU GLN  
 370 375 380  
 VAL GLY LYS MET PRO ALA ARG LEU ALA GLU PRO ALA PRO ASP PHE ASP  
 385 390 395 400  
 PRO ILE VAL THR ASP PRO VAL ALA THR TRP LYS ALA MET MET GLY THR  
 405 410 415  
 PRO THR ILE ALA ASP LYS SER SER LEU TYR ARG ARG TYR ASP ALA GLN  
 420 425 430  
 VAL GLN THR ASN THR VAL VAL LEU PRO GLY SER ASP ALA ALA VAL ILE  
 435 440 445  
 ARG ILE ARG GLY THR HIS ARG ALA LEU ALA MET THR THR ASP SER LYS  
 450 455 460  
 GLY ARG TYR LEU TYR LEU ASP PRO LYS ILE GLY ALA ALA MET SER VAL  
 465 470 475 480  
 ALA GLU ALA ALA ARG ASN LEU THR ALA SER GLY ALA GLU PRO LEU GLY  
 485 490 495  
 ILE THR ASP CYS LEU ASN PHE GLY ASP PRO THR LYS PRO GLU ALA PHE  
 500 505 510  
 TYR GLU LEU ALA GLU ALA ALA LYS GLY ILE ILE ALA ALA THR LYS ALA  
 515 520 525  
 PHE ASN ALA PRO VAL ILE SER GLY ASN VAL SER LEU TYR ASN GLU THR  
 530 535 540  
 ASN GLY LYS ALA ILE TYR PRO THR PRO MET ILE GLY MET VAL GLY LEU  
 545 550 555 560  
 ILE GLU ASP LEU SER THR ILE THR THR ALA ASN PHE LYS HIS ALA ASP  
 565 570 575  
 ASP LEU LEU TYR LEU VAL GLY GLU THR HIS GLY ASP PHE ASN GLY SER  
 580 585 590  
 GLU LEU GLN LYS LEU GLN THR GLY GLU VAL ALA GLY ARG LEU PHE ASP  
 595 600 605  
 PHE ASP LEU ASP ALA GLU LYS SER ASN GLN GLN PHE VAL LEU THR ALA  
 610 615 620  
 ILE ARG GLN HIS LEU VAL THR ALA ALA HIS ASP LEU SER ASP GLY GLY  
 625 630 635 640  
 LEU LEU VAL ALA LEU ALA GLU MET GLY PHE THR ASN GLN LEU GLY ALA  
 645 650 655  
 GLN VAL LYS VAL ASP LEU PRO THR SER TRP GLY PHE SER GLU THR GLN  
 660 665 670  
 GLY ARG PHE LEU VAL THR VAL ALA PRO GLU ASP GLN ALA ALA PHE GLU  
 675 680 685  
 ALA LEU ASN GLY PRO ALA GLU LEU ILE GLY ARG VAL GLN ALA ALA PRO  
 690 695 700  
 GLN PHE ASP VAL THR THR VAL SER HIS GLN PHE SER VAL PRO LEU GLU  
 705 710 715 720  
 GLU LEU GLN THR ALA PHE GLU GLU ALA LEU PRO CYS TYR LEU ASN GLN  
 725 730 735  
 LYS ALA

<210> 140

<211> 208

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 140

MET ILE VAL ILE VAL ASP TYR ASP THR GLY ASN THR LEU ASN VAL LYS  
1 5 10 15  
LYS ALA LEU ASP TYR LEU ALA ILE ASP ASN GLN LEU SER ALA ASP PRO  
20 25 30  
ALA VAL ILE LEU ALA ALA ALA GLY LEU ILE LEU PRO GLY VAL GLY ALA  
35 40 45  
PHE LYS THR ALA MET SER ALA LEU THR GLN ARG ASP LEU VAL PRO VAL  
50 55 60  
ILE ARG GLN PHE ALA ALA THR GLY LYS PRO LEU LEU GLY ILE CYS LEU  
65 70 75 80  
GLY MET GLN LEU LEU PHE ASP ARG SER PHE GLU PHE GLY GLU THR ALA  
85 90 95  
GLY LEU GLY LEU ILE PRO GLY THR VAL VAL ALA ILE PRO PRO ARG ALA  
100 105 110  
GLY PHE PRO THR PRO HIS MET GLY TRP ASN THR ASN THR ILE THR GLN  
115 120 125  
PRO ASP PRO PHE ALA ALA GLY PHE ALA ASN GLN ALA THR TYR PHE VAL  
130 135 140  
HIS SER TYR TYR VAL GLN THR GLN PRO ALA TYR THR LEU ALA THR THR  
145 150 155 160  
ASP TYR GLY GLN PRO LEU THR SER ILE VAL ARG ARG GLN ASN ILE LEU  
165 170 175  
GLY THR GLN PHE HIS PRO GLU LYS SER GLY ALA VAL GLY LEU ALA GLY  
180 185 190  
LEU GLN ARG PHE LYS GLU MET THR THR ASP ALA THR LEU SER SER ASN  
195 200 205

<210> 141

<211> 148

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 141

MET ALA GLU GLU GLN THR LEU VAL LEU VAL LYS PRO ASP GLY VAL ALA  
1 5 10 15  
GLN GLY HIS ILE GLY GLU VAL ILE THR ARG ILE GLU ARG ARG GLY PHE  
20 25 30  
THR ILE GLU ALA LEU LYS VAL THR GLN ALA THR SER ALA GLN LEU HIS  
35 40 45  
GLN HIS TYR ALA ALA LEU VAL ASP LYS PRO PHE PHE PRO LYS ILE GLU  
50 55 60  
ARG PHE MET THR SER GLY PRO LEU VAL ALA MET ILE VAL SER GLY PHE  
65 70 75 80  
ASN VAL ILE GLU ALA VAL ARG THR MET THR GLY ALA THR ASN PRO GLY  
85 90 95  
ASP ALA ALA PRO GLY THR ILE ARG GLY ASP PHE GLY ARG GLU TRP ALA  
100 105 110  
ASP GLN THR ILE ARG ASN VAL ILE HIS SER SER ASP SER GLU ALA SER  
115 120 125  
ALA GLN ARG GLU ILE PRO ILE TRP PHE ALA GLY LYS GLN TYR ALA PRO  
130 135 140  
LYS ALA ASN GLN  
145

<210> 142  
 <211> 1222  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 142  
 LEU TYR ASP LYS LYS ILE THR ASP ALA ALA VAL LYS PRO ASP THR ASP  
 1 5 10 15  
 ILE VAL VAL PRO ALA GLY LYS SER VAL GLN VAL PRO PHE THR LEU SER  
 20 25 30  
 LEU PRO LYS THR PHE ASP GLN GLN GLN PHE VAL GLU GLY PHE LEU ASN  
 35 40 45  
 PHE LYS GLY ASN ASP GLY SER SER LEU ASN LEU PRO TYR MET GLY PHE  
 50 55 60  
 PHE GLY ASP TRP ASN ASP GLY LYS ILE VAL ASP SER LEU ASN GLY VAL  
 65 70 75 80  
 THR TYR ASP PRO THR GLY GLY ASN TYR GLY THR VAL PRO MET LEU THR  
 85 90 95  
 ASN LYS LYS THR GLY SER GLN TYR TYR GLY GLY LEU VAL THR ASP ALA  
 100 105 110  
 SER GLY LYS GLN THR VAL ASP ASP LYS ALA VAL ALA PHE SER SER ASP  
 115 120 125  
 LYS ASN ALA LEU TYR ASN ASP ILE SER MET GLN TYR TYR LEU LEU ARG  
 130 135 140  
 ASN ILE SER ASP VAL GLN VAL ASP VAL LEU ASP ASN HIS GLY ASN LYS  
 145 150 155 160  
 VAL THR THR LEU SER SER SER ASN ASN GLN THR LYS THR TYR TYR ASP  
 165 170 175  
 SER THR GLY ARG ASN TYR THR TYR TYR ARG ALA PRO ALA TRP ASP GLY  
 180 185 190  
 THR TYR TYR ASP GLN ARG ASP GLY ASN ILE LYS THR ALA ALA ASP GLY  
 195 200 205  
 ASN TYR THR TYR ARG ILE SER GLY VAL PRO GLU GLY GLY ASP LYS ARG  
 210 215 220  
 GLN THR TYR ASP VAL ALA PHE THR LEU ASP SER LYS ALA PRO THR VAL  
 225 230 235 240  
 ARG HIS VAL ALA LEU THR SER ARG GLN GLU LYS GLY LYS THR THR TYR  
 245 250 255  
 TYR LEU THR ALA GLU ALA LYS ASP ASP ARG SER GLY LEU ASP ALA THR  
 260 265 270  
 LYS SER ALA LYS THR SER VAL ASN GLN VAL THR ASN LEU ASP GLY THR  
 275 280 285  
 PHE THR THR THR GLY THR THR ALA ASP GLY TYR THR LYS LEU GLU THR  
 290 295 300  
 PRO LEU THR ASP LYS GLN ALA GLN ALA LEU GLY GLN GLY ASP ASN ASN  
 305 310 315 320  
 VAL GLU LEU TYR LEU THR ASP ASN ALA SER ASN ALA THR ASP GLN SER  
 325 330 335  
 ALA SER ALA GLN LYS PRO GLY SER THR ALA TYR ASP LEU ILE ILE ASN  
 340 345 350  
 GLY GLY GLY LEU PRO ASP LYS ILE THR SER GLN THR ALA ASN TYR GLN  
 355 360 365  
 ALA GLY LYS GLN GLY GLY THR TYR THR PHE THR GLY THR TYR PRO ALA  
 370 375 380  
 ALA VAL TYR GLY THR TYR THR ASP ALA GLN GLY LYS GLN HIS ASP LEU  
 385 390 395 400

THR THR THR TYR ASP ALA ASP ALA ASN SER PHE LYS ALA THR MET ALA  
 405 410 415  
 LEU ASP ALA SER ASP TYR ALA THR LYS VAL ASP LEU TYR THR ASP GLN  
 420 425 430  
 ALA HIS THR GLN LEU VAL LYS HIS PHE ASP THR ASN VAL ARG LEU ALA  
 435 440 445  
 ALA PRO THR PHE SER ASP LEU ARG VAL ASN ASP ASN GLN ASP GLN THR  
 450 455 460  
 SER GLU SER THR VAL LYS VAL THR GLY THR ALA SER ALA ASP THR LYS  
 465 470 475 480  
 LYS VAL THR VAL THR ASN GLY GLY THR THR THR PRO VAL THR LEU ASP  
 485 490 495  
 ALA LYS HIS HIS PHE SER GLY ASP VAL PRO VAL ASN TYR GLY ASP ASN  
 500 505 510  
 THR ILE THR VAL THR ALA GLU ASP GLU ASP GLY ASN THR VAL THR LYS  
 515 520 525  
 GLN GLN LYS VAL ASN SER THR TYR ASP ALA ASP VAL LEU LYS ASN ALA  
 530 535 540  
 VAL THR PHE ASP GLN GLY VAL THR PHE GLY ALA ASN GLN LEU LYS VAL  
 545 550 555 560  
 LYS ASP ALA LYS TYR TYR ASP PRO LYS THR GLY ILE ALA THR ILE THR  
 565 570 575  
 GLY LYS VAL LYS HIS PRO THR THR THR LEU GLN VAL ASP GLY LYS GLN  
 580 585 590  
 VAL PRO ILE ASN ASP ASP LEU THR PHE SER PHE LYS LEU ASN LEU GLY  
 595 600 605  
 THR ALA GLY GLN LYS PRO PHE GLY VAL VAL ILE GLY ASP THR THR GLN  
 610 615 620  
 ASP LYS THR VAL GLN ASP SER LEU THR PHE ILE LEU ASP ALA VAL ALA  
 625 630 635 640  
 PRO THR LEU SER LEU ASP SER SER THR ASP LYS PRO VAL TYR THR ASN  
 645 650 655  
 ASP PRO ASN PHE ARG ILE THR GLY THR ALA THR ASP ASN VAL ASN TYR  
 660 665 670  
 LEU GLU LEU ALA ILE ASN GLY SER GLN VAL ALA SER GLN TYR GLU ASP  
 675 680 685  
 ILE ASN LEU ASN SER GLY GLN PRO GLY HIS MET ALA ILE ASP GLN THR  
 690 695 700  
 VAL LYS LEU LEU GLU GLY LYS ASN VAL LEU THR VAL ALA ALA THR ASP  
 705 710 715 720  
 SER GLY SER ASN VAL THR THR LYS LYS ILE THR VAL TYR TYR GLU PRO  
 725 730 735  
 LYS LYS THR LEU ALA ALA PRO THR ILE THR PRO ASN THR THR ASP PRO  
 740 745 750  
 ALA LYS GLU VAL THR LEU THR ALA LYS ALA ALA GLY GLU THR VAL  
 755 760 765  
 GLN TYR SER THR ASP GLY GLY LYS THR TYR GLN ASP LEU PRO THR THR  
 770 775 780  
 GLY LEU SER VAL SER ALA ASN ALA ASP PHE LYS PHE LYS ALA VAL ASP  
 785 790 795 800  
 LEU TYR GLY ASN GLU SER PRO ALA VAL ASP TYR ALA VAL LYS ASN ILE  
 805 810 815  
 LYS THR ASP ASP PRO ALA GLN LEU GLN LYS ALA LYS THR THR LEU GLN  
 820 825 830  
 ASP LEU LEU THR GLN ALA LYS ALA LYS ALA THR SER ALA GLN TYR THR

835                      840                      845  
 ASP ALA THR THR ASN ALA LEU ASN THR ALA ILE GLY SER ALA GLN THR  
 850                      855                      860  
 ALA LEU ALA LYS ALA ASP ALA THR ILE GLU THR LEU THR THR ALA THR  
 865                      870                      875                      880  
 THR GLN LEU THR THR ALA VAL ASN GLN LEU VAL ASP LYS LEU PRO ALA  
 885                      890                      895  
 ASP GLN GLN ALA ALA LEU LEU ASN LYS ILE GLN SER ALA LYS GLU ALA  
 900                      905                      910  
 PHE GLY THR ASP LEU GLY GLY GLN THR ASP PRO SER THR GLY LYS THR  
 915                      920                      925  
 LEU ASN ALA GLU LEU ASP ALA VAL ALA ALA GLN THR THR ALA GLY THR  
 930                      935                      940  
 SER THR ALA ASP GLN ILE GLU THR ASN PHE ASN LYS VAL LEU ASP ALA  
 945                      950                      955                      960  
 ALA LEU ASN GLN LEU ALA LYS THR ILE LYS ALA ALA THR PRO VAL LYS  
 965                      970                      975  
 VAL GLY ASN ALA LYS ASP THR THR THR GLY LYS THR TRP TYR GLY ASP  
 980                      985                      990  
 VAL ASP ALA VAL ILE ALA ALA GLY THR ALA ALA LYS THR ASP THR GLU  
 995                      1000                      1005  
 LYS ILE ALA GLN LEU GLN GLY LEU PHE GLY LEU LYS THR LYS ILE ALA  
 1010                      1015                      1020  
 ALA ALA VAL GLU ALA ALA ALA LYS THR PRO GLN GLN PRO GLY GLY GLY  
 1025                      1030                      1035                      1040  
 SER GLY SER GLY SER ASP THR GLY LYS GLY SER GLY SER GLY SER GLY  
 1045                      1050                      1055  
 SER GLU ALA GLY LYS GLY SER GLY THR GLY SER GLY SER GLU ALA GLY  
 1060                      1065                      1070  
 LYS GLY SER GLY SER GLY SER GLY SER ASP THR GLY LYS GLY SER GLY  
 1075                      1080                      1085  
 SER GLY SER GLY PRO ASP THR GLY LYS GLY SER GLY SER GLY SER GLY  
 1090                      1095                      1100  
 SER GLU ALA GLY LYS GLY SER GLY SER GLY SER GLY SER ASP THR GLY  
 1105                      1110                      1115                      1120  
 LYS GLY SER GLY SER GLY SER GLY SER ASP ALA GLY LYS GLY SER GLY  
 1125                      1130                      1135  
 THR ASP LYS GLU ASN GLN PRO LYS ASP THR PRO SER THR ASN PRO LYS  
 1140                      1145                      1150  
 GLY GLY ASP ASP LYS LYS GLN THR GLN GLU THR PRO ALA GLN PRO THR  
 1155                      1160                      1165  
 GLY THR GLU ASN ALA ASN SER ASN GLY ALA SER SER GLN ALA SER THR  
 1170                      1175                      1180  
 LYS ASP THR LEU PRO SER THR ASN GLU SER PRO ARG PRO ALA LEU ALA  
 1185                      1190                      1195                      1200  
 PHE LEU GLY ALA LEU VAL MET GLY GLY LEU GLY LEU LEU GLY ILE LYS  
 1205                      1210                      1215  
 ARG LYS ARG LYS GLN SER  
 1220

<210> 143

<211> 391

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 143

VAL HIS LEU ALA LYS ARG ILE LEU ASN VAL ALA PRO SER ALA THR LEU

1                    5                    10                    15  
ALA LEU SER ASN GLN THR LYS ASP LEU LYS ALA LYS GLY ALA ASP VAL  
20                    25                    30  
ILE ASP LEU SER ILE GLY GLN PRO ASP PHE SER THR PRO LYS ALA ILE  
35                    40                    45  
ASP ASP ALA ALA ILE ALA ALA ILE GLN ALA GLY ASN ALA SER PHE TYR  
50                    55                    60  
THR ALA ALA THR GLY ILE PRO GLU LEU LYS GLN ALA ILE SER ASP ARG  
65                    70                    75                    80  
ILE PHE ALA GLN ASP GLY ILE ARG TYR ASP HIS ARG GLN ILE VAL ALA  
85                    90                    95  
THR THR GLY ALA LYS PHE ALA LEU TYR ALA LEU PHE GLN VAL PHE LEU  
100                    105                    110  
ASN PRO GLY ASP GLU VAL LEU ILE PRO VAL PRO TYR TRP VAL SER TYR  
115                    120                    125  
GLU GLU GLN ILE LYS LEU ALA SER GLY VAL PRO HIS LEU VAL MET PRO  
130                    135                    140  
ALA VAL GLY HIS LYS VAL SER VAL ASP ASP LEU GLU ALA ALA ARG THR  
145                    150                    155                    160  
ASP LYS THR ARG ALA LEU ILE ILE ASN SER PRO GLN ASN PRO SER GLY  
165                    170                    175  
VAL VAL TYR ASP ARG THR GLU LEU THR LEU ILE GLY ASN TRP ALA LEU  
180                    185                    190  
LYS HIS HIS ILE LEU VAL VAL THR ASP ASP ILE TYR ARG ASP LEU ILE  
195                    200                    205  
TYR ASN GLY THR THR TYR THR SER MET ILE SER ILE ASP PRO ASP ILE  
210                    215                    220  
ALA ALA ASN THR VAL LEU ILE SER GLY VAL SER LYS SER TYR ALA MET  
225                    230                    235                    240  
THR GLY TRP ARG ILE GLY TYR ALA ALA GLY PRO GLU LYS LEU ILE GLN  
245                    250                    255  
ALA MET ALA THR PHE ILE SER HIS THR THR SER ASN PRO ALA ALA VAL  
260                    265                    270  
SER GLU TYR ALA ALA VAL ALA ALA LEU THR GLY ASP GLN GLN VAL VAL  
275                    280                    285  
GLU LYS MET ARG ARG ALA PHE GLU GLU ARG LEU ASN LEU PHE TYR ASP  
290                    295                    300  
LEU LEU ALA ASP ILE PRO GLY PHE ASP MET GLY ASP LYS PRO GLN GLY  
305                    310                    315                    320  
ALA PHE TYR LEU PHE PRO ASN ILE LYS ARG ALA ALA GLN LEU SER HIS  
325                    330                    335  
TYR GLY THR VAL ASP ASP PHE ILE SER ALA LEU LEU THR GLU THR GLY  
340                    345                    350  
VAL ALA ILE VAL PRO GLY ARG ALA PHE GLY MET PRO ASP HIS ALA ARG  
355                    360                    365  
ILE SER TYR CYS LYS ASP LEU ALA SER LEU LYS GLU ALA ALA ARG ARG  
370                    375                    380  
ILE ARG GLU PHE VAL GLY LYS  
385                    390

<210> 144

<211> 458

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 144

MET LYS CYS ALA GLY GLY ASN THR MET ALA SER GLU LYS SER SER LEU  
 1 5 10 15  
 LYS SER THR ILE ARG VAL SER ILE THR ASN PHE LEU ASP SER GLY SER  
 20 25 30  
 ILE VAL ALA GLY ALA SER GLY LEU THR LEU TRP THR GLN HIS PHE GLY  
 35 40 45  
 LEU SER SER PHE GLN VAL GLY LEU LEU ARG ALA LEU SER ALA ASN ALA  
 50 55 60  
 PHE GLY ALA ALA LEU GLY ALA LEU ILE GLY GLY PRO LEU SER ASP LYS  
 65 70 75 80  
 PHE GLY ARG LYS LEU ILE TYR THR TYR ASP MET LEU VAL TYR MET VAL  
 85 90 95  
 GLY THR ILE LEU VAL MET PHE ALA LEU ASN PHE PRO MET LEU LEU ALA  
 100 105 110  
 GLY PHE LEU VAL THR GLY LEU ALA VAL GLY ALA GLY VAL PRO ALA SER  
 115 120 125  
 TRP THR TYR ILE SER GLU THR SER GLN ASP ASP ASN ARG ALA LYS ASN  
 130 135 140  
 ILE GLY VAL SER GLN PHE ALA TRP SER LEU GLY PRO ALA VAL ILE PHE  
 145 150 155 160  
 ILE LEU GLY THR VAL LEU ALA PRO LEU GLY LEU PHE GLY ASN ARG ILE  
 165 170 175  
 LEU PHE GLY LEU LEU THR VAL ILE ALA PHE ILE ALA TRP LEU LEU GLN  
 180 185 190  
 ARG GLY LEU GLY GLU SER LYS ALA TRP GLN ASP GLN LYS ALA PHE GLU  
 195 200 205  
 LYS SER SER GLY GLU LYS SER HIS PRO TYR ARG THR LEU PHE SER ASN  
 210 215 220  
 LYS THR SER LEU LYS TRP LEU CYS PHE LEU VAL GLY VAL TYR MET PHE  
 225 230 235 240  
 TRP ASN LEU VAL ALA GLY ALA MET GLY PHE PHE MET PRO TYR VAL TYR  
 245 250 255  
 GLU THR ALA GLY GLY LEU SER ASN GLN GLU ALA ASN LEU LEU GLN ALA  
 260 265 270  
 VAL LEU TRP VAL LEU THR ALA LEU ALA THR TYR PHE GLY PHE ALA LYS  
 275 280 285  
 TYR GLY ASP LYS ALA ASN HIS ARG ILE PHE PHE PHE VAL GLY ALA ALA  
 290 295 300  
 MET ALA ALA ALA SER TRP ILE VAL LEU THR TYR ALA GLY MET ALA GLN  
 305 310 315 320  
 SER TRP SER LEU TRP ALA PHE VAL ALA LEU TRP GLY ILE SER ALA GLY  
 325 330 335  
 ILE GLY ALA GLN ALA TRP TYR ALA LEU TRP ALA THR GLU LEU PHE PRO  
 340 345 350  
 THR GLN PHE ARG ALA GLY SER GLN GLY VAL MET PHE PHE LEU VAL ARG  
 355 360 365  
 ALA SER ALA GLY VAL TRP SER ILE ILE PHE PRO ALA ILE LEU ASN SER  
 370 375 380  
 LEU GLY PHE THR VAL ALA GLY THR PHE MET ILE GLY LEU LEU LEU VAL  
 385 390 395 400  
 SER LEU VAL ILE GLY THR ILE TRP THR PRO LYS THR ARG GLY LYS SER  
 405 410 415  
 LEU GLU GLU ILE THR ARG GLU GLN TYR GLY ASP LYS PHE LEU THR ASP  
 420 425 430  
 ASP GLU LYS SER LYS ALA ASP ARG ASP THR ALA ALA LYS ASP THR GLY  
 435 440 445  
 SER GLU ARG VAL SER PRO GLN SER ILE ASN

450

455

&lt;210&gt; 145

&lt;211&gt; 493

&lt;212&gt; PRT

&lt;213&gt; LACTOBACILLUS RHAMNOSUS

&lt;400&gt; 145

MET LYS GLU VAL VAL MET SER ILE ARG GLN PHE PRO GLU ASN PHE LEU  
 1 5 10 15  
 TRP GLY GLY ALA THR ALA ALA ASN GLN LEU GLU GLY ALA TYR ASN VAL  
 20 25 30  
 ASP GLY LYS GLY LEU SER THR SER ASP LEU LEU LEU GLY GLY THR HIS  
 35 40 45  
 ASN VAL PRO ARG GLN LEU THR ARG GLU VAL ARG PRO ASP ALA PHE TYR  
 50 55 60  
 PRO SER HIS GLU ALA ILE ASP HIS PHE HIS ARG TYR GLN GLU ASP ILE  
 65 70 75 80  
 ALA LEU PHE ALA GLU MET GLY PHE LYS VAL TYR ARG PHE SER ILE ALA  
 85 90 95  
 TRP THR ARG ILE TYR PRO ASN GLY SER ALA SER ASP GLY PRO SER LYS  
 100 105 110  
 GLU GLY LEU ALA PHE TYR ALA ALA LEU ILE ALA GLU LEU LYS ARG TYR  
 115 120 125  
 ASN ILE GLU PRO LEU VAL THR ILE SER HIS PHE GLU SER PRO ILE ALA  
 130 135 140  
 LEU THR LYS ALA PHE ASN GLY TRP ALA SER ARG ASP MET ILE GLU GLU  
 145 150 155 160  
 TYR VAL THR PHE ALA GLN THR ILE ILE ALA ASN PHE HIS ASN ASP VAL  
 165 170 175  
 HIS TYR TRP LEU THR PHE ASN GLU ILE ASN MET LEU THR ARG PRO MET  
 180 185 190  
 GLY ALA TYR LEU ALA GLY GLY MET TYR VAL ASP ASP THR ASN ARG PHE  
 195 200 205  
 ILE SER PRO ASP ILE ASP SER THR GLN MET ARG LEU GLN ALA LEU HIS  
 210 215 220  
 HIS GLN PHE VAL ALA SER ALA ARG VAL CYS SER PHE ALA HIS GLY PHE  
 225 230 235 240  
 ASP PRO ASN LEU LYS ILE GLY CYS MET LEU ALA TYR ARG MET LEU TYR  
 245 250 255  
 PRO LEU THR SER HIS PRO GLU ASP ILE ALA LEU VAL GLN THR ALA THR  
 260 265 270  
 GLU LEU ASN ASN PHE TYR CYS GLY ASP VAL GLN VAL LYS GLY ARG TYR  
 275 280 285  
 PRO TYR PHE ALA LYS ARG TYR TRP ARG ASP HIS ASP ILE THR ILE ASP  
 290 295 300  
 ILE GLU PRO TRP GLU GLU ILE LEU LYS ARG GLY THR VAL ASP PHE  
 305 310 315 320  
 PHE ALA LEU SER TYR TYR GLN SER SER THR MET THR THR THR GLU SER  
 325 330 335  
 GLY GLU THR SER GLY GLY ASN PHE PHE ALA GLY VAL LYS ASN PRO TYR  
 340 345 350  
 LEU GLN ARG ASN ASP TRP GLY TRP GLU ILE ASP PRO ARG GLY LEU ARG  
 355 360 365  
 THR ALA LEU ASN GLN ILE TYR ASP ARG TYR GLN VAL PRO VAL MET VAL  
 370 375 380  
 VAL GLU ASN GLY PHE GLY ALA ARG ASP GLU LEU ILE GLU GLN ASP GLY



385                    390                    395                    400  
 GLN LYS THR VAL ASN ASP THR ALA ARG ILE ASN TYR LEU ARG ALA HIS  
                          405                    410                    415  
 ILE ALA ALA MET TYR ASP ALA ILE GLN ASP GLY VAL ASP LEU ILE GLY  
                          420                    425                    430  
 TYR THR SER TRP ALA PRO ILE ASP LEU ILE SER ALA SER THR GLY GLU  
                          435                    440                    445  
 MET ALA LYS ARG TYR GLY TYR ILE TYR VAL ASP LYS HIS ASP ASP GLY  
                          450                    455                    460  
 SER GLY THR LEU ASN ARG TYR ARG LYS GLN SER PHE TYR TRP TYR GLN  
 465                    470                    475                    480  
 GLN VAL ILE ARG GLN ASN GLY LEU SER GLU SER ASP ALA  
                          485                    490

<210> 146  
 <211> 496  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 146  
 MET GLU GLU LEU LEU GLU SER SER LEU LEU LYS HIS TYR GLU ILE ILE  
 1                    5                    10                    15  
 SER PHE LEU LEU ASP LYS GLU TRP VAL THR ILE LYS GLN VAL ALA GLU  
                          20                    25                    30  
 GLU THR ARG ILE PRO ALA ARG THR ILE ARG GLN ASN ILE GLY THR ILE  
                          35                    40                    45  
 ASN GLN TYR ILE ALA PRO ALA LYS ILE GLU SER SER GLN ARG TYR GLY  
 50                    55                    60  
 ILE ARG LEU ALA TYR ASP SER ALA HIS ASN PRO LEU TYR ILE TYR ALA  
 65                    70                    75                    80  
 ALA ILE TYR ARG GLN SER THR ARG PHE LEU ILE LEU GLU GLN ILE PHE  
                          85                    90                    95  
 LEU HIS HIS TYR LEU SER ILE ALA GLN PHE SER GLU ALA LEU PHE ILE  
                          100                    105                    110  
 SER GLU SER THR LEU LYS ARG HIS MET GLN VAL LEU ASN GLN ILE LEU  
                          115                    120                    125  
 PRO HIS TYR GLY PHE HIS ILE ASP THR GLN THR LEU ASP ILE ILE GLY  
 130                    135                    140  
 ASP GLU LYS LYS ILE HIS PHE PHE TYR TYR THR TYR LEU LEU GLU ARG  
 145                    150                    155                    160  
 TYR TRP PHE ILE ASP ASP PHE LEU PRO GLN ASP GLU LEU LYS LEU ILE  
                          165                    170                    175  
 ALA ALA ILE ILE SER GLU PHE PHE ALA HIS TYR PRO THR LEU THR THR  
                          180                    185                    190  
 PRO ARG TYR GLN SER PHE SER PHE ILE ASN LYS LEU ARG ALA THR ILE  
                          195                    200                    205  
 PHE VAL CYS LEU LYS ARG ASN SER ARG GLY HIS THR PHE GLU ASN ALA  
 210                    215                    220  
 THR PRO ALA ILE GLU ASN ALA THR PHE SER PRO GLU LEU ARG GLN SER  
 225                    230                    235                    240  
 ILE ALA ARG CYS TYR LYS ILE ASP CYS SER SER LEU VAL PHE SER HIS  
                          245                    250                    255  
 LEU PHE TYR LEU PHE PHE ASN PRO ARG ASN ALA TRP SER TYR ALA ASP  
                          260                    265                    270  
 LEU LEU THR LYS THR HIS GLN ASP ALA GLU ILE ARG ALA ILE HIS ARG  
                          275                    280                    285  
 ALA LEU THR HIS PHE LEU ASP MET VAL VAL ALA THR GLU HIS LEU SER

290                      295                      300  
 LEU PRO ASN ARG GLU GLN VAL LEU LEU ARG LEU TYR ASN ALA ILE GLU  
 305                      310                      315                      320  
 TYR THR TRP GLY PRO THR LYS ILE LEU TYR SER PRO SER GLU ALA PHE  
                     325                      330                      335  
 PHE ALA SER MET ASN GLN PHE SER LYS THR PHE ILE ARG GLN ALA ARG  
                     340                      345                      350  
 GLN THR LEU VAL THR ALA LEU ARG ASN GLU LYS VAL ASN VAL ARG ILE  
                     355                      360                      365  
 ASP ASP ALA PHE ILE THR LYS LEU LEU PHE THR LEU VAL THR SER GLY  
                     370                      375                      380  
 GLU THR LEU PRO LEU GLN LEU GLU GLN LYS ALA PRO LYS VAL ARG THR  
 385                      390                      395                      400  
 GLY LEU PHE PHE ASN THR SER PHE GLU HIS SER HIS PHE LEU LEU ASN  
                     405                      410                      415  
 GLU LEU ASN TYR HIS LEU ARG SER ASN LEU LYS LEU GLU LEU VAL PRO  
                     420                      425                      430  
 ALA SER THR LEU ALA GLU LEU LYS THR VAL ALA ARG GLN PHE ASP LEU  
                     435                      440                      445  
 ILE ILE THR ASN LEU PRO LEU LEU ASN LEU PRO ASN CYS GLN VAL VAL  
                     450                      455                      460  
 ALA ILE GLN PRO HIS PRO THR PRO GLU ASP PHE ASP ASN ILE LEU ALA  
 465                      470                      475                      480  
 ALA TYR ASN ARG ILE ILE ASN ALA LYS SER LEU GLU SER SER VAL SER  
                     485                      490                      495

<210> 147

<211> 244

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 147

MET ILE PHE ARG LYS PRO GLN PRO PHE GLU TYR GLU GLY THR ASP THR  
 1                      5                      10                      15  
 GLY VAL VAL LEU LEU HIS ALA TYR THR GLY SER PRO ASN ASP MET ASN  
                     20                      25                      30  
 PHE MET ALA ARG ALA LEU GLN ARG SER GLY TYR GLY VAL TYR VAL PRO  
                     35                      40                      45  
 LEU PHE SER GLY HIS GLY THR VAL GLU PRO LEU ASP ILE LEU THR LYS  
                     50                      55                      60  
 GLY ASN PRO ASP ILE TRP TRP ALA GLU SER SER ALA ALA VAL ALA HIS  
 65                      70                      75                      80  
 MET THR ALA LYS TYR ALA LYS VAL PHE VAL PHE GLY LEU SER LEU GLY  
                     85                      90                      95  
 GLY ILE PHE ALA MET LYS ALA LEU GLU THR LEU PRO GLY ILE THR ALA  
                     100                      105                      110  
 GLY GLY VAL PHE SER SER PRO ILE LEU PRO GLY LYS HIS HIS LEU VAL  
                     115                      120                      125  
 PRO GLY PHE LEU LYS TYR ALA GLU TYR MET ASN ARG LEU ALA GLY LYS  
                     130                      135                      140  
 SER ASP GLU SER THR GLN ILE LEU ALA TYR LEU PRO GLY GLN LEU ALA  
 145                      150                      155                      160  
 ALA ILE ASP GLN PHE ALA THR THR VAL ALA ALA ASP LEU ASN LEU VAL  
                     165                      170                      175  
 LYS GLN PRO THR PHE ILE GLY GLN ALA GLY GLN ASP GLU LEU VAL ASP  
                     180                      185                      190  
 GLY ARG LEU ALA TYR GLN LEU ARG ASP ALA LEU ILE ASN ALA ALA ARG

195                      200                      205  
 VAL ASP PHE HIS TRP TYR ASP ASP ALA LYS HIS VAL ILE THR VAL ASN  
 210                      215                      220  
 SER ALA HIS HIS ALA LEU GLU GLU ASP VAL ILE ALA PHE MET GLN GLN  
 225                      230                      235                      240  
 GLU ASN GLU GLY

<210> 148  
 <211> 399  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 148  
 MET SER LEU LEU ALA THR LEU LEU GLN ALA LEU ASP ASP ASP GLU GLN  
 1                      5                      10                      15  
 GLU MET ILE ALA ILE ARG ARG GLN LEU HIS ALA HIS PRO GLU VAL SER  
 20                      25                      30  
 PHE HIS GLU LYS GLN THR ALA ALA TYR ILE LYS ALA TYR TYR ALA ALA  
 35                      40                      45  
 LEU ASP MET PRO VAL VAL PRO CYS GLY ASP GLY TYR GLY MET TYR VAL  
 50                      55                      60  
 ASP ILE GLU GLY GLY GLN PRO GLY PRO LYS LEU ALA LEU ARG ALA ASP  
 65                      70                      75                      80  
 PHE ASP ALA LEU ALA ILE GLN GLU ASP ASN GLU LEU PRO PHE LYS SER  
 85                      90                      95  
 GLN ASN PRO GLY VAL MET HIS ALA CYS GLY HIS ASP ALA HIS THR ALA  
 100                      105                      110  
 TYR LEU LEU VAL LEU ALA LYS GLU LEU ASN LYS ILE LYS THR GLN LEU  
 115                      120                      125  
 SER GLY SER ILE PRO ILE ILE HIS GLN PRO ALA GLU GLU VAL SER PRO  
 130                      135                      140  
 GLY GLY ALA LYS GLY MET ILE ALA ALA GLY VAL LEU GLU GLY VAL THR  
 145                      150                      155                      160  
 ASN VAL ILE GLY VAL HIS VAL MET SER SER MET PRO THR GLY LEU ILE  
 165                      170                      175  
 GLY TYR HIS THR GLY ALA THR GLN THR GLY ARG ALA ASN PHE THR ASP  
 180                      185                      190  
 THR ILE ILE GLY LYS GLY GLY HIS ALA SER MET PRO HIS LEU SER ASN  
 195                      200                      205  
 ASP ALA ILE VAL ALA GLY SER TYR LEU VAL THR ALA LEU GLN THR ILE  
 210                      215                      220  
 VAL SER ARG ARG ILE ASP PRO PHE ASP THR ALA SER VAL THR ILE GLY  
 225                      230                      235                      240  
 SER PHE ASP GLY VAL GLY SER PHE ASN ALA ILE LYS GLN ALA VAL VAL  
 245                      250                      255  
 LEU LYS GLY ASP VAL ARG VAL MET LYS GLU SER THR ARG GLN THR ILE  
 260                      265                      270  
 HIS GLN GLN ILE VAL THR MET ASN HIS GLY LEU GLU ALA MET PHE GLY  
 275                      280                      285  
 VAL GLN THR LYS LEU ASP TYR ASP ASP ASN TYR PRO VAL LEU ILE ASN  
 290                      295                      300  
 ASP ALA THR LEU THR ASN GLN ALA MET ALA ALA ILE LYS ALA ALA LYS  
 305                      310                      315                      320  
 ILE PRO GLN ILE THR ALA ILE LYS ASP THR GLY VAL GLN ASP PRO SER  
 325                      330                      335  
 GLU ASP PHE ALA TYR PHE ALA GLN LYS VAL PRO SER SER PHE PHE TYR

340                      345                      350  
 ILE GLY CYS GLN LEU PRO ASP GLY SER ASN HIS PRO HIS HIS SER PRO  
 355                      360                      365  
 ASP PHE MET LEU ASP GLU ASP ALA ILE LEU ILE ALA ALA LYS ALA VAL  
 370                      375                      380  
 ALA ALA ALA THR LEU GLY TYR LEU ASP GLN ASN LYS THR VAL GLN  
 385                      390                      395

<210> 149  
 <211> 237  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 149  
 MET TRP LYS VAL ILE THR ASP ALA VAL PRO GLN MET ILE ALA ALA GLY  
 1                      5                      10                      15  
 ILE LYS TYR THR ILE PRO ILE ALA LEU VAL SER PHE ALA ILE GLY LEU  
 20                      25                      30  
 ILE ILE ALA LEU VAL THR ALA LEU THR ARG ILE SER VAL ARG LYS GLY  
 35                      40                      45  
 ILE LEU ILE ARG ILE ALA LYS GLY ILE ALA VAL PHE TYR VAL TRP LEU  
 50                      55                      60  
 PHE ARG SER THR PRO LEU LEU VAL GLN LEU PHE ILE VAL PHE PHE GLY  
 65                      70                      75                      80  
 LEU PRO SER LEU ILE ILE PRO GLY ILE PHE PRO HIS GLY ILE LYS LEU  
 85                      90                      95  
 ASP PRO ALA ALA ALA GLY ILE ILE THR PHE SER LEU ASN THR GLY ALA  
 100                      105                      110  
 TYR CYS ALA GLU THR THR ARG ALA SER LEU LEU SER ILE ASP SER GLY  
 115                      120                      125  
 GLN TRP GLU ALA ALA TYR ALA ILE GLY LEU PRO ARG ARG LEU VAL LEU  
 130                      135                      140  
 ARG GLU ILE ILE ILE PRO GLN ALA LEU ARG THR ALA ILE PRO PRO LEU  
 145                      150                      155                      160  
 SER ASN SER PHE ILE SER LEU ILE LYS ASP THR SER LEU ALA ALA SER  
 165                      170                      175  
 ILE THR ILE VAL GLU MET PHE GLN VAL SER GLN GLN ILE ALA ALA GLU  
 180                      185                      190  
 ASN TYR GLN PRO LEU LEU MET TYR SER ILE VAL ALA LEU LEU TYR ALA  
 195                      200                      205  
 ILE VAL CYS THR PHE LEU ALA TRP GLY GLN ARG TYR LEU GLU LYS PHE  
 210                      215                      220  
 THR SER ARG TYR ASN ALA ASN ALA GLN THR THR GLN LEU  
 225                      230                      235

<210> 150  
 <211> 567  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 150  
 MET SER LYS LYS ILE ILE VAL ILE GLY GLY VAL ALA GLY GLY ALA SER  
 1                      5                      10                      15  
 VAL ALA ALA ARG ALA ARG ARG LEU ASP GLU SER ALA GLN ILE THR MET  
 20                      25                      30  
 TYR GLU LYS GLY PRO ASN VAL SER PHE SER ASN CYS ALA LEU PRO TYR  
 35                      40                      45

HIS LEU SER GLY MET ILE PRO ASP ALA GLU SER ILE VAL LEU MET ASP  
 50 55 60  
 SER GLU GLN PHE LYS GLN GLN TYR ASN ILE ASP ALA ILE VAL ASN HIS  
 65 70 75 80  
 GLU VAL THR ALA ILE HIS ALA GLU THR GLN THR VAL THR VAL LYS ASP  
 85 90 95  
 VAL ARG THR GLY GLU VAL THR THR ASP SER TYR ASP ASP LEU PHE LEU  
 100 105 110  
 SER PRO GLY ALA VAL PRO ILE LEU PRO ARG SER ILE HIS GLY ILE GLN  
 115 120 125  
 ASN THR ASN VAL PHE THR ILE ARG ASN VAL ASP ASP ILE LYS ALA LEU  
 130 135 140  
 ALA THR ALA LEU LYS ASP ARG LYS ALA THR ASN VAL SER VAL ILE GLY  
 145 150 155 160  
 GLY GLY PHE ILE GLY ILE GLU ALA ALA GLU ASN LEU VAL LYS GLY GLY  
 165 170 175  
 TYR HIS VAL ASN LEU ILE GLU GLY ALA ASP HIS ILE LEU ALA THR ILE  
 180 185 190  
 ASP GLN ASP MET ALA GLN LEU VAL GLN LYS THR MET LEU ASP ASN ASP  
 195 200 205  
 VAL ARG LEU ILE VAL HIS ASP THR LEU THR ALA ILE GLU ASN ASP HIS  
 210 215 220  
 ILE THR LEU ALA SER GLY LYS GLU LEU PRO THR ASP ILE VAL ILE MET  
 225 230 235 240  
 ALA ILE GLY VAL LYS ALA ASP THR GLU LEU ALA GLN GLN SER GLY ILE  
 245 250 255  
 LYS LEU GLY LYS THR GLY ASN ILE GLN VAL ASN GLN ALA PHE GLN THR  
 260 265 270  
 ASN LEU PRO HIS VAL TYR ALA VAL GLY ASP ALA ILE GLU VAL TYR GLN  
 275 280 285  
 ARG LEU LEU ARG GLN PRO THR ARG LEU ASN LEU ALA PHE PRO ALA GLN  
 290 295 300  
 LEU GLN ALA ARG GLN ALA VAL ASP HIS ALA PHE GLY ARG GLN ILE ARG  
 305 310 315 320  
 ASN ARG GLY VAL ILE GLY SER GLN CYS LEU PRO VAL PHE ASN MET ASN  
 325 330 335  
 VAL ALA SER THR GLY LEU THR ALA ARG GLN CYS GLN ASP ALA LYS ILE  
 340 345 350  
 ASP TYR ARG GLU ALA LEU VAL ILE PRO LYS ASP LYS VAL ALA LEU ILE  
 355 360 365  
 PRO GLY ALA LYS PRO LEU TYR LEU LYS LEU ILE PHE ALA TYR PRO SER  
 370 375 380  
 GLY GLU ILE LEU GLY ALA GLN ALA ILE GLY GLU SER GLY VAL ASP LYS  
 385 390 395 400  
 GLN ILE ASP ILE ILE ALA THR ALA ILE THR ASN HIS ASN TYR VAL GLU  
 405 410 415  
 ASP LEU GLU THR LEU GLU LEU CYS TYR GLN PRO THR PHE SER THR ALA  
 420 425 430  
 LYS ASN ALA VAL ASN MET ALA GLY LEU VAL ALA THR ASN ILE LEU ASN  
 435 440 445  
 GLY GLU PHE LYS GLN ILE MET VAL SER GLN VAL ARG PRO LEU VAL GLU  
 450 455 460  
 ALA GLY ALA MET LEU ILE ASP VAL ARG GLU PRO ASP GLU PHE ALA GLU  
 465 470 475 480  
 GLY HIS ILE ILE SER ALA LYS ASN ILE PRO MET SER ARG PHE ARG GLU  
 485 490 495  
 HIS LEU ASP GLU ILE PRO ARG ASP GLN PRO VAL TYR ILE HIS CYS LEU

500                      505                      510  
 SER GLY GLN ARG SER TYR ASN VAL ALA ARG ALA LEU GLY ASN LYS GLY  
 515                      520                      525  
 TYR HIS ASN ILE TYR ASN ILE ALA GLY SER PHE LEU ASP LEU CYS GLU  
 530                      535                      540  
 PHE GLU TYR PHE GLU ASP THR THR GLN ASN ARG LYS PRO ILE VAL THR  
 545                      550                      555                      560  
 ASN TYR ARG PHE ASP LEU LEU  
 565

<210> 151  
 <211> 385  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<220>  
 <221> VARIANT  
 <222> (1)...(385)  
 <223> XAA = ANY AMINO ACID

<400> 151  
 MET ILE TYR PHE ASP ASN SER ALA THR THR LYS ILE SER PRO ASP ALA  
 1                      5                      10                      15  
 LEU ALA THR TYR ASN LYS VAL SER THR ASP PHE PHE GLY ASN PRO SER  
 20                      25                      30  
 SER LEU HIS ALA LEU GLY THR LYS ALA ASN GLU VAL LEU GLN SER SER  
 35                      40                      45  
 ARG ALA GLN ILE ALA LYS LEU ILE GLY ALA LYS PRO ASP GLU ILE TYR  
 50                      55                      60  
 PHE THR SER GLY GLY THR GLU GLY ASP ASN TRP VAL ILE LYS GLY THR  
 65                      70                      75                      80  
 ALA MET ALA LYS ARG GLU PHE GLY ARG HIS LEU ILE THR THR SER ILE  
 85                      90                      95  
 GLU HIS PRO ALA VAL ILE ASN THR MET LYS GLN LEU GLU LYS LEU GLY  
 100                      105                      110  
 PHE GLU VAL THR TYR LEU PRO VAL ASP ARG ARG GLY PHE ILE HIS ILE  
 115                      120                      125  
 ASP ASP LEU LYS ALA ALA ILE ARG LYS ASP THR ILE LEU VAL SER ILE  
 130                      135                      140  
 MET ALA VAL ASN ASN GLU ILE GLY SER MET GLN PRO ILE VAL GLN ALA  
 145                      150                      155                      160  
 ALA ARG VAL LEU ASP ASN TYR PRO ASN ILE HIS PHE HIS VAL ASP ALA  
 165                      170                      175  
 VAL GLN XAA VAL GLY LYS GLY LEU ASP ALA ALA LEU GLN ASP PRO ARG  
 180                      185                      190  
 ILE ASP PHE LEU SER PHE SER GLY HIS LYS PHE HIS ALA PRO ARG GLY  
 195                      200                      205  
 THR GLY PHE ILE TYR ALA LYS GLU GLY ARG MET LEU ASP PRO LEU LEU  
 210                      215                      220  
 THR GLY GLY GLY GLN GLU HIS ASP TRP ARG SER GLY THR GLU ASN VAL  
 225                      230                      235                      240  
 PRO ALA ILE ALA ALA MET ALA LYS SER LEU ARG LEU LEU LEU ALA ASN  
 245                      250                      255  
 GLU ASP ALA ASN VAL ALA ARG GLN GLN ALA VAL ARG LYS ARG ILE PHE  
 260                      265                      270  
 GLU HIS VAL SER GLN LYS PRO LYS VAL THR MET PHE SER GLN LEU THR  
 275                      280                      285

PRO ASP PHE ALA PRO HIS VAL LEU CYS PHE ALA ILE ALA GLY VAL ARG  
 290 295 300  
 GLY GLU THR ILE VAL HIS ALA PHE GLU ASP HIS GLN ILE TYR ILE SER  
 305 310 315 320  
 THR THR SER ALA CYS SER SER LYS LYS GLY THR GLU SER SER THR LEU  
 325 330 335  
 ALA ALA MET HIS THR ASP PRO LYS ILE ALA THR SER ALA ILE ARG VAL  
 340 345 350  
 SER LEU ASP GLU ALA ASN THR LEU ASP GLU ALA ASP ALA PHE ASN ALA  
 355 360 365  
 ALA PHE ASP THR ILE TYR ALA LYS PHE ALA LYS LEU ASP LYS ALA THR  
 370 375 380  
 VAL  
 385

<210> 152

<211> 398

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 152

MET ARG GLU GLN PHE PRO PHE PHE LYS ALA HIS PRO GLY LEU VAL TYR  
 1 5 10 15  
 LEU ASP THR ALA ALA THR SER GLN LYS PRO GLN ALA LEU LEU ASP SER  
 20 25 30  
 LEU GLN ASN TYR TYR ILE ASN GLU ASN ALA ASN VAL HIS ARG GLY LEU  
 35 40 45  
 TYR LYS LEU ALA TYR ASP THR THR GLU ALA TYR GLU GLY VAL ARG GLN  
 50 55 60  
 GLU VAL ALA ASP PHE LEU SER ALA LYS SER ALA ASP GLU ILE ILE PHE  
 65 70 75 80  
 THR ARG GLY THR THR ASP SER LEU ASN LEU VAL ALA SER ALA PHE GLY  
 85 90 95  
 PRO HIS ALA VAL PRO GLU GLY GLY ARG ILE VAL VAL SER GLY ALA GLU  
 100 105 110  
 HIS HIS SER ASN PHE ILE PRO TRP GLN GLN LEU ALA LYS ARG GLN HIS  
 115 120 125  
 ALA LYS PHE GLU VAL THR PRO VAL HIS PRO ASP GLY MET VAL ASP VAL  
 130 135 140  
 PRO ALA LEU LEU ALA ILE THR PRO GLU THR ASN LEU VAL ALA ILE  
 145 150 155 160  
 ALA GLN VAL THR ASN VAL ALA GLY ASP THR LEU PRO ILE ALA ALA ILE  
 165 170 175  
 ALA LYS LYS ALA HIS ALA VAL GLY ALA VAL VAL VAL VAL ASP GLY ALA  
 180 185 190  
 GLN ALA VAL ALA HIS LEU PRO VAL ASP VAL GLN THR LEU GLY ALA ASP  
 195 200 205  
 PHE TYR ALA PHE SER GLY HIS LYS ILE TYR GLY PRO THR GLY ILE GLY  
 210 215 220  
 VAL LEU TYR GLY ARG ALA ASP LEU LEU ALA LYS MET PRO PRO ILE GLN  
 225 230 235 240  
 PHE GLY GLY GLU MET ILE SER GLU VAL ARG ASP ASP VAL SER THR TRP  
 245 250 255  
 ALA GLU GLY PRO ILE LYS TYR GLU ALA GLY THR PRO ASN ILE ALA GLY  
 260 265 270  
 VAL ILE GLY LEU GLY THR ALA LEU HIS TRP PHE LYS GLN ASN VAL ASP  
 275 280 285

ALA ALA VAL LEU LYS THR GLU HIS ASP LEU SER ASP GLN LEU ARG SER  
 290 295 300  
 GLY LEU ALA ALA ILE PRO ASP VAL THR ILE TYR GLY ASN GLN ALA SER  
 305 310 315 320  
 LEU ALA THR VAL SER PHE ASN LEU ALA GLY ILE HIS PRO HIS ASP LEU  
 325 330 335  
 ALA THR PHE LEU ASP GLU GLN GLN ILE ALA VAL ARG ALA GLY HIS HIS  
 340 345 350  
 CYS ALA GLN PRO LEU MET ALA ARG LEU GLY VAL PRO ALA THR VAL ARG  
 355 360 365  
 ALA SER PHE GLY VAL TYR ASN ASN ALA ASP ASP VAL ALA LYS LEU VAL  
 370 375 380  
 GLU THR VAL GLN ALA ALA ARG ARG TYR PHE HIS GLY VAL ASP  
 385 390 395

<210> 153

<211> 146

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 153

MET LEU GLU THR LYS LYS THR LEU GLU ALA GLN GLU ILE GLN ALA ILE  
 1 5 10 15  
 LEU PRO HIS ARG TYR PRO MET LEU MET ILE ASP ARG VAL LEU ASP LEU  
 20 25 30  
 LYS PRO GLY GLU SER VAL VAL ALA GLN LYS ASN VAL SER ILE ASN GLU  
 35 40 45  
 GLN ILE PHE GLN GLY HIS PHE PRO GLY ASN PRO ILE PHE PRO GLY VAL  
 50 55 60  
 LEU GLN ILE GLU ALA MET ALA GLN ALA GLY ALA ILE ALA LEU LEU SER  
 65 70 75 80  
 MET PRO ASP PHE LYS GLY LYS THR ALA TYR LEU GLY GLY ILE LYS LYS  
 85 90 95  
 ALA LYS PHE ARG HIS MET VAL ARG PRO GLY ASP VAL LEU ARG ILE GLU  
 100 105 110  
 VAL THR LEU GLU LYS LEU ILE ASP ASN ALA GLY LEU GLY LYS GLY LYS  
 115 120 125  
 VAL TYR VAL GLY GLU ASP MET ALA CYS SER ALA GLU LEU VAL PHE ALA  
 130 135 140  
 ILE GLY  
 145

<210> 154

<211> 448

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 154

MET ASP ASN GLN PHE LYS GLN TYR GLN LEU LYS PRO PHE VAL ILE ALA  
 1 5 10 15  
 GLY LEU ASP ALA MET GLY ILE THR GLN PRO THR PRO ILE GLN LYS LYS  
 20 25 30  
 VAL ILE PRO ALA LEU LEU ARG GLY GLU ASN LEU VAL GLY GLN SER GLN  
 35 40 45  
 THR GLY SER GLY LYS THR HIS ALA PHE LEU VAL PRO LEU LEU SER LEU  
 50 55 60  
 VAL ASP PRO ASN GLU ASP ALA THR GLN VAL VAL ILE THR ALA PRO SER



65                    70                    75                    80  
 ARG GLU LEU ALA ASN GLN ILE TYR ALA VAL ALA GLN GLN LEU THR GLN  
                   85                    90                    95  
 THR GLU PRO ALA ILE ARG ILE SER ARG LEU VAL GLY GLY MET ASP LYS  
                   100                    105                    110  
 GLN LYS GLN ILE ASP LYS LEU GLN ALA HIS GLN PRO HIS VAL ALA ILE  
                   115                    120                    125  
 GLY THR PRO GLY ARG ILE LEU ASP MET ILE LYS ARG TYR ASP LEU VAL  
                   130                    135                    140  
 PRO ALA SER VAL ARG HIS PHE VAL VAL ASP GLU ALA ASP MET THR LEU  
 145                    150                    155                    160  
 ASP MET GLY PHE LEU GLU THR VAL ASP ALA ILE ALA SER SER PHE PRO  
                   165                    170                    175  
 GLU HIS LEU GLN MET ALA VAL PHE SER ALA THR ILE PRO GLN LYS LEU  
                   180                    185                    190  
 GLU PRO PHE LEU ARG LYS TYR MET ASP HIS PRO THR VAL ILE GLU LEU  
                   195                    200                    205  
 LYS PRO GLN SER VAL ILE ALA ASP THR VAL GLU ASN ILE LEU ILE ALA  
                   210                    215                    220  
 VAL LYS GLY ARG ASP LYS ASN GLU LEU ILE TYR GLN LEU VAL THR MET  
 225                    230                    235                    240  
 GLY HIS PRO PHE LEU VAL LEU ILE PHE ALA ASN THR LYS THR SER VAL  
                   245                    250                    255  
 ASP ALA ILE HIS ASP TYR LEU LYS HIS GLN GLY LEU LYS VAL ALA LYS  
                   260                    265                    270  
 ILE HIS GLY GLY ILE GLN PRO ARG GLU ARG ARG ARG ILE MET LYS GLU  
                   275                    280                    285  
 VAL ALA ASP LEU LYS TYR GLN TYR VAL VAL ALA THR ASP LEU ALA ALA  
                   290                    295                    300  
 ARG GLY ILE ASP ILE LYS GLY VAL SER MET VAL ILE ASN ALA GLU ILE  
 305                    310                    315                    320  
 PRO ARG ASP GLN GLU PHE PHE ILE HIS ARG VAL GLY ARG THR GLY ARG  
                   325                    330                    335  
 ASN GLY LEU PRO GLY THR ALA ILE THR LEU TYR GLU PRO GLY GLN GLU  
                   340                    345                    350  
 ASP GLN ILE ALA GLU LEU GLU HIS MET GLY ILE LYS PHE LYS PRO LYS  
                   355                    360                    365  
 THR ILE GLN LYS GLY GLU LEU VAL ASP THR TYR ASP ARG ASN ARG ARG  
                   370                    375                    380  
 VAL GLN ARG LYS PRO LYS GLN GLU ASP THR SER LEU ALA ILE ARG GLY  
 385                    390                    395                    400  
 LEU VAL LYS LYS ALA LYS GLN LYS HIS MET PRO ASN TYR ARG LYS LYS  
                   405                    410                    415  
 ILE ARG THR ALA VAL LEU LEU GLU ARG LYS ARG ASN ALA LYS VAL ALA  
                   420                    425                    430  
 ARG ARG GLN ALA LEU LEU ALA GLU LYS ARG LYS HIS ARG LYS ARG GLY  
                   435                    440                    445

<210> 155

<211> 290

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 155

MET LYS LEU ALA TYR ASP PRO SER MET PHE ARG ASP SER MET THR LEU  
   1                  5                  10                  15  
 LYS GLN MET PHE ASP GLU VAL ALA ARG LEU GLY TYR GLU TYR VAL GLU

20 25 30  
 LEU SER PRO ARG ARG ASP PHE ILE TRP PHE TYR GLU HIS PRO VAL ALA  
 35 40 45  
 ASP HIS THR LEU ILE LYS GLN VAL LYS LYS TYR ALA LYS ASP ALA GLY  
 50 55 60  
 VAL LYS ILE SER SER ILE LEU PRO VAL GLN GLN TRP SER SER PRO ASP  
 65 70 75 80  
 GLU GLN GLU ARG GLU PHE ALA VAL ARG ASN LEU LYS ARG THR ILE GLU  
 85 90 95  
 ILE THR ALA GLU LEU GLU VAL LEU VAL LEU ASN THR GLU PHE ALA GLY  
 100 105 110  
 ASP LYS PHE GLN PRO LEU VAL SER GLN GLY GLN TRP TYR LYS SER MET  
 115 120 125  
 ALA GLU LEU ALA PRO VAL PHE GLU LYS ASN ASN ILE GLU LEU GLU ILE  
 130 135 140  
 GLN PRO HIS PRO ASN ASP PHE ILE GLU SER ASN LEU ALA ALA THR ARG  
 145 150 155 160  
 LEU ILE ARG SER LEU ASP LEU ASP TRP VAL HIS GLN VAL TRP CYS SER  
 165 170 175  
 ALA HIS ALA PHE TYR MET ASP ASP GLY ARG GLY ASP ILE ARG GLN GLN  
 180 185 190  
 PHE ALA GLU SER GLY GLU ARG ILE THR HIS VAL LEU ILE ALA ASP THR  
 195 200 205  
 PHE ASN HIS LYS GLY ASN PHE GLY LEU ARG TYR ILE ILE ASN PRO PRO  
 210 215 220  
 GLY ALA PRO VAL THR ILE HIS GLN HIS LEU ASN PRO GLY GLU GLY GLU  
 225 230 235 240  
 VAL ASP PHE THR THR LEU TYR GLN VAL LEU ASN GLU ARG HIS PHE ASP  
 245 250 255  
 GLY ILE ILE THR ASN ASN VAL PHE ALA TRP PRO ASP ARG VAL ASP TRP  
 260 265 270  
 SER ASN ASP VAL THR LEU GLN SER ILE GLN SER GLY LEU HIS LEU LEU  
 275 280 285  
 LYS THR  
 290

<210> 156

<211> 295

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 156

MET GLY ILE GLU LEU THR GLN MET ALA LEU ASN ARG LYS ILE ALA GLN  
 1 5 10 15  
 LYS ARG PRO LEU GLU ASN PHE PHE GLN LEU ALA GLU ALA ALA GLY ILE  
 20 25 30  
 HIS GLN VAL GLU LEU ARG ASN ASP MET THR THR SER ASP GLY SER GLU  
 35 40 45  
 THR VAL ILE ASP GLY MET GLN VAL ALA GLU PHE GLN THR LEU LYS GLN  
 50 55 60  
 LYS TYR ASP LEU GLN ILE LEU THR ILE ASN ALA ILE GLN GLN PHE ASN  
 65 70 75 80  
 ASN PRO ALA LYS LEU ASN LYS ASN ARG ASP LEU LEU THR LYS LEU ALA  
 85 90 95  
 GLU LEU SER ALA GLN ILE GLY ASN GLN ALA ILE ILE PHE VAL PRO GLU  
 100 105 110  
 VAL ASN ALA GLN ASP LYS ARG THR GLU GLN GLN ARG LEU ASP ASP ALA

115 120 125  
 VAL SER SER LEU GLN VAL PHE GLY ASP ILE LEU SER ALA TYR HIS LEU  
 130 135 140  
 THR GLY PHE ILE GLU PRO LEU GLY PHE ARG ALA SER THR MET ARG TYR  
 145 150 155 160  
 PRO TRP THR ALA LEU ASP ALA ILE ASN LEU SER GLY ARG THR GLU PHE  
 165 170 175  
 LYS LEU THR ILE ASP THR PHE HIS PHE PHE LEU ALA HIS LEU THR ALA  
 180 185 190  
 GLU GLN PHE LYS ALA GLY VAL ASP ILE ASN ARG VAL GLY LEU ILE HIS  
 195 200 205  
 LEU SER GLY ILE GLU PRO ILE HIS ALA LEU ARG GLU VAL VAL ASP GLU  
 210 215 220  
 ASP ARG ILE LEU ILE THR GLU ARG ASP ILE MET GLN ASN ILE GLU GLN  
 225 230 235 240  
 VAL HIS LEU PHE GLU ALA MET GLY TYR ARG GLY HIS TYR SER PHE GLU  
 245 250 255  
 PRO PHE SER SER ARG LEU ALA ALA GLU THR ASN GLN GLN LEU THR GLN  
 260 265 270  
 GLN ILE LEU ALA SER ILE GLU ARG LEU ASN GLN PRO THR ALA VAL PHE  
 275 280 285  
 SER THR GLU VAL THR GLN PRO  
 290 295

<210> 157

<211> 231

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 157

MET ASN GLN VAL VAL SER ALA VAL LYS LYS ASN LEU ASP LEU SER GLN  
 1 5 10 15  
 ASN ARG PRO ILE LYS GLU ALA ILE TYR GLU ALA LEU ARG LYS THR ILE  
 20 25 30  
 LEU LEU GLY GLU ILE PRO SER GLY GLU ARG ILE ASN GLU LYS ASN LEU  
 35 40 45  
 SER GLU ASN LEU ASN ILE SER ARG THR PRO ILE ARG TYR ALA LEU GLU  
 50 55 60  
 ARG LEU ASP GLU GLU ASP LEU VAL GLU ARG LYS THR GLY VAL GLY VAL  
 65 70 75 80  
 LEU VAL LYS GLY ILE SER ILE ASN ASP ALA TYR GLU ILE PHE ASP ILE  
 85 90 95  
 ARG LYS GLU LEU ASP VAL LEU ALA THR ARG LYS ALA MET ARG LEU MET  
 100 105 110  
 THR PRO GLU GLN PHE ASN GLN MET ARG THR LEU LEU GLU GLU THR ASP  
 115 120 125  
 ARG LEU ASN ALA ALA GLY ARG VAL ALA GLU VAL MET ALA LYS PHE THR  
 130 135 140  
 GLU PHE ASN ASN PHE ILE TYR ASP ALA SER HIS MET LEU ARG LEU LYS  
 145 150 155 160  
 MET ILE VAL ASN GLN LEU GLN ASN TYR LEU ILE TYR PHE ARG ASP ILE  
 165 170 175  
 SER ILE ASN GLY ASP ASP ARG ARG ASN LEU ALA ILE GLN GLU HIS TRP  
 180 185 190  
 LEU LEU TYR ARG GLY MET LEU ASN GLN ASP ASP ASP GLN ILE LYS LEU  
 195 200 205  
 ILE THR ARG GLU HIS LEU GLU HIS SER LEU HIS TYR ILE LEU LYS VAL

210  
MET LYS ALA LYS HIS ILE GLU  
225 230

220

<210> 158  
<211> 467  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 158  
MET ALA LYS GLN LYS VAL GLN PHE MET GLU THR VAL LEU ARG ASP GLY  
1 5 10 15  
GLN GLN SER LEU ILE ALA THR ARG MET PRO SER SER ASP ILE LEU PRO  
20 25 30  
ILE LEU ASP LYS MET ASP ALA ALA GLY TYR HIS ALA LEU GLU MET TRP  
35 40 45  
GLY GLY ALA THR PHE ASP ALA CYS LEU ARG TYR LEU ASN GLU ASP PRO  
50 55 60  
TRP GLU ARG LEU ARG LYS ILE ARG GLN ALA VAL LYS HIS THR LYS LEU  
65 70 75 80  
GLN MET LEU LEU ARG GLY GLN ASN LEU LEU GLY TYR LYS ASN TYR ALA  
85 90 95  
ASP ASP VAL VAL ALA ASP PHE VAL THR LYS SER VAL GLU ASN GLY ILE  
100 105 110  
ASP ILE ILE ARG ILE PHE ASP ALA LEU ASN ASP THR ARG ASN LEU LYS  
115 120 125  
THR ALA LEU GLU ALA THR LYS GLN ALA GLY GLY HIS ALA GLN LEU ALA  
130 135 140  
ILE SER TYR THR THR SER ASP PHE HIS THR ILE ASP TYR PHE ILE ARG  
145 150 155 160  
LEU ALA LYS GLU MET ALA ASP MET GLY ALA ASP SER ILE ALA ILE LYS  
165 170 175  
ASP MET ALA GLY ILE LEU THR PRO GLN LYS ALA PHE ASP LEU VAL SER  
180 185 190  
GLY ILE LYS GLN GLU ILE THR VAL PRO LEU GLU VAL HIS THR HIS ALA  
195 200 205  
THR ALA GLY MET ALA GLU MET THR TYR LEU GLU ALA VAL ARG ALA GLY  
210 215 220  
ALA ASP ILE ILE ASP THR ALA VAL SER PRO PHE ALA GLY GLY THR SER  
225 230 235 240  
GLN PRO ALA THR GLU SER MET LEU VAL ALA LEU GLN ASP LEU GLY TYR

245 250 255  
PRO THR ASP VAL LYS LEU ALA GLU VAL SER ASP ILE ALA SER TYR PHE  
260 265 270  
ALA PRO ILE ARG ASP ARG PHE ARG ASP ALA GLY GLN LEU ASN PRO ARG  
275 280 285  
VAL LYS ASP VAL GLU PRO LYS SER LEU ILE TYR GLN VAL PRO GLY GLY  
290 295 300  
MET LEU SER ASN LEU LEU ALA GLN LEU LYS ASP GLN GLY GLN GLU ALA  
305 310 315 320  
LEU TYR GLY ASP VAL LEU LYS GLU VAL PRO ARG VAL ARG ALA ASP LEU  
325 330 335  
GLY TYR PRO PRO LEU VAL THR PRO LEU SER GLN MET VAL GLY THR GLN  
340 345 350  
SER LEU MET ASN VAL MET SER GLY GLU ARG TYR LYS LEU ILE PRO LYS  
355 360 365

GLU ILE LYS ASP TYR VAL ARG GLY LEU TYR GLY GLN PRO PRO VAL PRO  
 370 375 380  
 ILE SER PRO GLU MET LYS LYS LYS ILE ILE GLY ASP ALA PRO VAL ILE  
 385 390 395 400  
 THR THR ARG PRO ALA ASP LEU ILE GLU PRO GLN LEU PRO ALA PHE ARG  
 405 410 415  
 LYS ALA ILE ALA GLU TYR ALA HIS SER GLU GLU ASP VAL LEU SER TYR  
 420 425 430  
 ALA LEU PHE PRO ASP GLN ALA LYS ASP PHE LEU GLY ARG ARG GLU ASP  
 435 440 445  
 PRO PHE TYR ASP VAL PRO VAL GLN LYS VAL SER LEU THR PHE ASP PRO  
 450 455 460  
 THR HIS ASN  
 465

<210> 159  
 <211> 283  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<220>  
 <221> VARIANT  
 <222> (1)...(283)  
 <223> XAA = ANY AMINO ACID

<400> 159  
 MET GLY LEU PHE LYS SER ALA GLY LYS LEU XAA ASN ARG LEU GLN LEU  
 1 5 10 15  
 THR HIS MET GLY PHE GLU ALA VAL HIS PHE ASN TYR ALA ASP TYR GLU  
 20 25 30  
 ALA PHE ASP LEU LEU THR GLN GLY THR LEU VAL PRO THR ARG ASP PHE  
 35 40 45  
 VAL GLU ARG GLN ARG GLU VAL LYS ASP ASP ASP GLU LEU ALA LEU ILE  
 50 55 60  
 LYS GLN ALA VAL ALA ILE ALA GLU LYS GLY TYR GLN HIS VAL LEU ALA  
 65 70 75 80  
 THR ILE LYS PRO GLY MET ARG GLU ILE ASP ILE ALA ASN ASP LEU ASP  
 85 90 95  
 PHE TYR MET ARG LYS LEU GLY ALA SER ASN VAL SER PHE GLU THR ILE  
 100 105 110  
 VAL ALA SER GLY ALA ARG SER ALA MET PRO HIS GLY ALA ALA THR GLU  
 115 120 125  
 LYS LYS ILE ALA LYS GLY ASP VAL VAL THR LEU ASP TRP GLY CYS ILE  
 130 135 140  
 TYR HIS GLY TYR MET SER ASP LEU THR ARG THR PHE ALA VAL GLY GLN  
 145 150 155 160  
 PRO ASP LEU LYS LEU LYS THR ILE TYR LYS ILE VAL TYR GLU THR ASN  
 165 170 175  
 GLN LYS VAL GLN GLN ALA LEU LYS PRO GLY VAL LEU GLY ARG THR ILE  
 180 185 190  
 ASN ASP LEU ALA HIS HIS THR ILE ASN ASP ALA GLY TYR GLY GLN TYR  
 195 200 205  
 PHE GLY HIS GLY THR GLY HIS GLY ILE GLY LEU SER ILE HIS GLU GLY  
 210 215 220  
 PRO GLY ALA TRP GLY PRO TYR LEU ASP VAL PRO ALA ALA LYS GLY ASN  
 225 230 235 240  
 VAL VAL THR ASP GLU PRO GLY ILE TYR ILE PRO GLU LEU GLY GLY VAL

245                      250                      255  
 ARG ILE GLU ASP ASP LEU VAL VAL THR ALA ASP GLY ASN GLN SER LEU  
 260                      265                      270  
 SER GLN PRO ALA PRO ALA ASP LEU LEU VAL LEU  
 275                      280

<210> 160  
 <211> 393  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 160  
 MET ASP LYS VAL VAL ILE LEU SER ALA LYS ARG THR PRO ILE GLY LYS  
 1                      5                      10                      15  
 LEU GLY GLY GLU LEU ALA GLY ALA SER ALA VAL ASP LEU GLY VAL THR  
 20                      25                      30  
 ALA ALA LYS ALA ALA ILE LYS ALA ALA ARG LEU ASP PRO GLN GLN LEU

35                      40                      45  
 ASP GLN ALA ILE PHE GLY ASN VAL LEU GLN ALA GLY SER GLY GLN ASN  
 50                      55                      60  
 VAL ALA ARG GLN ILE ALA LEU HIS SER GLY MET ALA THR ASN SER THR  
 65                      70                      75                      80  
 ALA MET THR ILE ASN GLU VAL CYS GLY SER GLY LEU LYS ALA ILE ARG  
 85                      90                      95  
 LEU GLY GLN ALA ALA ILE GLN LEU GLY GLU ALA ASN ALA VAL LEU VAL  
 100                      105                      110  
 GLY GLY THR GLU SER MET SER GLN VAL PRO TYR TYR ALA GLU ALA MET  
 115                      120                      125  
 ARG ALA GLY HIS LYS PHE GLY ASP THR ALA LEU VAL ASP GLY LEU SER  
 130                      135                      140  
 ARG ASP GLY LEU ASN ASP ALA PHE SER GLN GLN PRO MET GLY ILE THR  
 145                      150                      155                      160  
 ALA GLU ASN VAL ALA SER ARG PHE GLN ILE SER ARG GLN ALA GLN ASP  
 165                      170                      175  
 GLU PHE ALA LEU ARG SER HIS LEU ARG ALA ALA ALA ALA ALA GLU  
 180                      185                      190  
 GLY ARG PHE LYS SER GLN ILE ALA PRO VAL THR ILE SER GLY ARG HIS  
 195                      200                      205  
 GLY ASP VAL THR ILE ASP THR ASP SER ALA ILE ARG PRO ASP THR SER  
 210                      215                      220  
 LEU ALA GLN LEU ALA LYS LEU PRO PRO VAL PHE GLU VAL GLY GLY THR  
 225                      230                      235                      240  
 VAL THR ALA GLY ASN ALA SER GLY ILE ASN ASP GLY ALA ALA ALA LEU  
 245                      250                      255  
 ILE LEU MET ALA LYS SER LYS ALA GLU GLN LEU GLY LEU HIS TYR LEU  
 260                      265                      270  
 ALA THR ILE THR ASP TYR THR GLU VAL GLY ILE ASP PRO ASP ILE MET  
 275                      280                      285  
 GLY TYR ALA PRO LYS LEU ALA ILE ASP GLN LEU MET GLN LYS THR GLY  
 290                      295                      300  
 GLN THR LEU THR ALA ILE ASP GLN VAL GLU LEU ASN GLU ALA PHE ALA  
 305                      310                      315                      320  
 SER GLN SER VAL ALA VAL MET ARG ASP LEU GLY LEU THR ASP GLU GLN  
 325                      330                      335  
 VAL ASN ILE ASN GLY GLY ALA LEU ALA LEU GLY HIS PRO LEU GLY ALA  
 340                      345                      350

SER GLY ALA ARG ILE MET VAL SER LEU LEU TYR ASN LEU ALA GLU ARG  
355 360 365  
ARG GLN GLN THR GLY ILE ALA ALA LEU CYS VAL GLY GLY GLY ILE GLY  
370 375 380  
MET ALA MET GLN VAL THR LEU HIS ASP  
385 390

<210> 161  
<211> 234  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 161  
MET ALA GLN LEU ASP THR GLU LYS ILE ILE SER THR ILE ALA ASN SER  
1 5 10 15  
LYS LYS THR THR PRO VAL LYS VAL TYR LEU LYS GLY LYS LEU ALA ASP  
20 25 30  
LEU HIS PHE PRO LYS SER VAL HIS ALA PHE ILE GLY LYS HIS THR GLY  
35 40 45  
THR VAL ILE GLY ASP TRP THR GLU ILE GLN PRO VAL LEU LYS THR ALA  
50 55 60  
LYS LEU ASP ASP TYR TYR VAL GLU ALA ALA GLY ARG ASN THR GLY VAL  
65 70 75 80  
PRO LEU LEU ASP ILE LYS THR THR ASN ALA ARG ILE GLU PRO GLY ALA  
85 90 95  
ILE ILE ARG ASP GLN VAL LEU ILE GLY ASP ASN ALA VAL ILE MET MET  
100 105 110  
GLY ALA ILE ILE ASN ILE GLY ALA GLU ILE GLY ALA GLY THR MET ILE  
115 120 125  
ASP MET GLY ALA VAL LEU GLY GLY ARG ALA ILE VAL GLY LYS HIS CYS  
130 135 140  
HIS ILE GLY ALA GLY THR VAL LEU ALA GLY VAL VAL GLU PRO PRO SER  
145 150 155 160  
ALA LYS PRO VAL THR ILE GLY ASP HIS VAL MET THR GLY ALA ASN ALA  
165 170 175  
VAL VAL LEU GLU GLY VAL THR VAL GLY GLU GLY ALA VAL ILE ALA ALA  
180 185 190  
GLY ALA VAL VAL ILE ASN ASP VAL PRO ALA HIS THR VAL VAL ALA GLY  
195 200 205  
VAL PRO ALA LYS VAL ILE LYS LYS VAL ASN ASP GLN THR GLU ALA LYS  
210 215 220  
THR VAL LEU LEU ASP GLU LEU ARG LYS LEU  
225 230

<210> 162  
<211> 262  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 162  
MET PRO THR LYS ILE GLY LEU HIS TYR ASN LYS ILE GLY VAL GLY LYS  
1 5 10 15  
THR ILE TYR PHE LEU HIS GLY MET GLY LEU ASP GLY HIS SER MET ALA  
20 25 30  
ALA PHE TYR GLU PRO ARG PHE THR SER GLU GLU ARG HIS PHE ALA ARG  
35 40 45  
LEU TYR PRO ASP LEU PRO GLY MET GLY ASN SER PRO ALA THR SER ALA

50                      55                      60  
 LEU GLN SER ALA ASP VAL LEU ALA GLN VAL HIS ALA PHE ILE GLN  
 65                      70                      75                      80  
 ALA THR SER GLU GLY PRO CYS TYR LEU VAL GLY HIS SER TYR GLY GLY  
                     85                      90                      95  
 TYR LEU ALA LEU GLY LEU LEU ALA ARG PHE PRO ASP GLU PHE SER GLY  
                     100                      105                      110  
 ALA PHE LEU THR ALA PRO VAL VAL LEU ALA GLU LYS THR ALA ARG THR  
                     115                      120                      125  
 VAL ALA THR LEU LYS HIS LEU ILE SER ALA PRO VAL THR SER GLN SER  
                     130                      135                      140  
 PRO GLU PHE THR ASP TYR GLN HIS MET ASN VAL VAL ILE ASN PRO SER  
 145                      150                      155                      160  
 THR TRP ARG GLN TYR GLN GLU LEU ILE LEU PRO GLY LEU LYS THR PHE  
                     165                      170                      175  
 ASN ARG ASP PHE TRP VAL ALA MET LYS ASN ARG HIS ALA TYR ARG LEU  
                     180                      185                      190  
 SER ILE GLU SER ARG LEU THR SER LEU ILE LYS SER PRO VAL THR LEU  
                     195                      200                      205  
 VAL LEU GLY GLU ASN ASP ASN GLU VAL GLY TYR GLN ASP GLN VAL VAL  
                     210                      215                      220  
 PHE ALA HIS LYS GLY ALA HIS MET THR THR THR VAL ILE PRO ASN ALA  
 225                      230                      235                      240  
 GLY HIS ASN LEU MET ILE ASP ALA PRO GLU ALA VAL MET THR ALA PHE  
                     245                      250                      255  
 HIS GLN PHE LEU HIS LYS  
                     260

<210> 163

<211> 537

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 163

MET ILE PHE PHE ILE ASN SER ASN PHE ASN LYS ASN ASN SER GLY ILE  
 1                      5                      10                      15  
 GLU HIS ALA GLN LEU LYS ARG ALA GLY LEU PHE ARG ASP HIS HIS VAL  
                     20                      25                      30  
 PRO PHE LYS MET ILE PHE ARG GLU TRP ASN PRO ARG LEU HIS GLU TYR  
                     35                      40                      45  
 LEU ASN HIS ASN GLY VAL SER ASP ASP GLU ALA LEU ASN MET PHE ASP  
                     50                      55                      60  
 TYR TYR GLN ASN ALA GLU GLN VAL PRO ALA LYS ILE LEU HIS ALA GLU  
 65                      70                      75                      80  
 ASP ILE ASP PHE GLY PHE ASP LYS LEU SER TYR ALA LYS GLU PRO ASP  
                     85                      90                      95  
 ASN HIS ARG TYR LEU VAL THR ARG GLY LYS LEU PHE VAL GLY ARG ILE  
                     100                      105                      110  
 ASN TYR PHE GLU ASP ASP SER ALA GLU ARG VAL SER SER VAL GLU GLN  
                     115                      120                      125  
 PHE ASP GLY PHE GLY ASN LEU TYR ARG VAL ASP PHE TYR ASP PHE ARG  
                     130                      135                      140  
 GLY PHE LEU SER LEU SER GLN TRP TYR THR PRO ASP ASN LYS VAL GLY  
 145                      150                      155                      160  
 THR GLU VAL TRP HIS LYS VAL ASP GLY ARG PRO VAL ILE GLU THR PHE  
                     165                      170                      175  
 ASN LYS TYR ASP ALA ASN HIS ALA PHE ILE LYS THR GLY TRP ARG LEU



180 185 190  
 ILE GLU ASP ASN GLY ALA VAL TYR MET PHE SER ASN ILE ASP ASP LEU  
 195 200 205  
 THR GLN HIS PHE TYR ASN ASN VAL ASN GLU GLN TYR TRP ASN ASP LYS  
 210 215 220  
 GLU VAL ASN VAL PHE ILE LEU ASP ARG SER HIS LEU GLY ASP TRP GLN  
 225 230 235 240  
 LEU ILE HIS LEU GLN ARG PRO ALA TYR ILE VAL MET ASN LEU HIS ASN  
 245 250 255  
 SER HIS ALA GLY ASP ALA GLN ASP PRO MET HIS SER VAL MET ASN ASN  
 260 265 270  
 PHE TYR GLU TYR SER LEU ILE HIS ALA ASN ASP TYR ASP ALA ILE VAL  
 275 280 285  
 SER ALA THR ASN LYS GLN THR HIS ASP VAL ARG GLU ARG PHE HIS PRO  
 290 295 300  
 THR CYS LYS LEU PHE THR ILE PRO VAL GLY VAL LEU PRO ASP GLU GLN  
 305 310 315 320  
 LEU ALA ARG PRO HIS VAL ALA MET THR ASP ARG GLN PRO ALA LYS VAL  
 325 330 335  
 LEU VAL THR ALA ARG VAL ALA PRO GLU LYS GLN ILE ASP HIS ILE VAL  
 340 345 350  
 ALA ALA ILE GLY ILE ALA LYS LYS ASP VAL PRO ASN ILE SER LEU ASP  
 355 360 365  
 VAL TYR GLY TYR VAL ASP HIS ARG ASP ASP ASN ARG ALA MET LYS ARG  
 370 375 380  
 ILE ASN ALA ALA ILE GLU LYS TYR HIS LEU GLN GLY ALA ILE LYS LEU  
 385 390 395 400  
 HIS ASP TYR THR ASN ASP VAL GLY ALA VAL GLN ARG ASN ALA GLN VAL  
 405 410 415  
 TYR ALA LEU ALA SER VAL MET GLU GLY PHE ASN LEU SER LEU MET GLU  
 420 425 430  
 ALA LEU SER ASN GLY MET VAL GLY VAL THR TYR ASP VAL ASN TYR GLY  
 435 440 445  
 PRO ASN GLU LEU VAL VAL ASP GLY LYS ASN GLY PHE VAL VAL PRO PHE  
 450 455 460  
 GLY ASP ILE LYS ALA MET ALA ALA LYS PHE VAL GLU LEU PHE THR HIS  
 465 470 475 480  
 PRO ASP GLU LEU GLN GLN MET SER ASP GLN ALA TYR GLU LEU SER ASP  
 485 490 495  
 ARG TYR SER GLU ALA ASN VAL TRP LYS ALA TRP GLN ALA LEU LEU ASP  
 500 505 510  
 ASP ALA LYS LYS LYS ASP ILE HIS TYR THR GLU GLU ILE SER ALA GLY  
 515 520 525  
 ILE GLY ASP GLN ARG VAL LYS LYS ALA  
 530 535

<210> 164

<211> 436

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 164

LEU LYS PHE GLY GLN LYS PRO GLN PRO LYS SER PRO ALA THR LYS TYR  
 1 5 10 15  
 GLN TYR HIS ILE ASP GLY VAL ASP PRO ASN GLU SER LYS ILE VAL TYR  
 20 25 30  
 HIS GLY LYS THR ILE GLY LYS VAL ASN ILE ALA PRO GLY THR VAL GLY

35 40 45  
 LEU VAL GLY SER ILE GLU TYR TYR ASN ASP MET ASN THR VAL VAL ALA  
 50 55 60  
 LYS ASP ILE TRP ASP ARG ARG GLY PHE LYS SER SER THR GLN TYR PHE  
 65 70 75 80  
 HIS PRO ASP GLY ALA PHE GLY PRO GLN VAL PHE TYR ASP ARG ASP GLY  
 85 90 95  
 LYS PRO LYS ILE GLU ILE THR ARG MET ASN VAL ASN GLY GLU LEU ARG  
 100 105 110  
 ASN THR MET TYR LYS LEU LEU ASP TYR GLN GLY ARG ALA TRP ARG PHE  
 115 120 125  
 ASP THR GLU ASN GLU MET PHE VAL PHE PHE MET ASN GLU LEU MET LEU  
 130 135 140  
 LYS HIS SER GLY VAL LEU ILE ASN ASP ARG PRO SER LEU ILE SER GLU  
 145 150 155 160  
 VAL ALA ALA VAL VAL GLY ALA ARG GLY LYS TRP GLN PHE LEU HIS SER  
 165 170 175  
 ALA HIS THR TYR LYS PRO GLU GLN ALA GLY GLY SER ARG ASN TYR VAL  
 180 185 190  
 ASP TYR LEU GLN PRO LEU PHE ALA THR HIS MET ASN ASP PHE ASP GLY  
 195 200 205  
 VAL MET VAL PRO THR VAL GLU GLN LYS GLN GLU ILE ASP LYS PHE PHE  
 210 215 220  
 HIS PHE LYS HIS VAL VAL VAL PRO ASP SER TYR ALA GLU PRO HIS  
 225 230 235 240  
 LYS LEU VAL PRO ALA GLU LYS ARG ASP ARG ASN LYS ILE VAL TYR LEU  
 245 250 255  
 GLY ARG ILE SER PRO GLU LYS GLU PRO GLN GLU ALA VAL LYS ILE PHE  
 260 265 270  
 ALA LYS ALA LYS LYS ASP LEU PRO ASP LEU HIS LEU GLU PHE TYR GLY  
 275 280 285  
 TYR SER SER ASP GLN SER LEU ASP ASN SER LEU LYS GLU LEU ILE LYS  
 290 295 300  
 LYS LEU GLU ILE GLU ASP ALA VAL HIS PHE ASN GLY TYR GLN ASN ASN  
 305 310 315 320  
 ASP GLN LEU ALA LYS LYS LEU GLY ASP ALA ALA ALA VAL LEU SER THR  
 325 330 335  
 SER SER SER GLU ALA PHE GLY MET ASN VAL LEU GLN ALA MET SER PHE  
 340 345 350  
 GLY VAL PRO VAL ILE GLY TYR GLN VAL LYS TYR GLY MET LYS LEU VAL  
 355 360 365  
 VAL LYS GLU GLY ILE SER GLY TYR LEU VAL PRO ASN GLY GLU SER GLN  
 370 375 380  
 GLN GLY ALA LYS ALA LEU VAL LYS LEU LEU THR ASP LYS ASP LYS TRP  
 385 390 395 400  
 ALA ASP MET LEU GLU SER THR TYR GLU SER SER GLN LYS PHE ASN ALA  
 405 410 415  
 ALA ALA ALA TRP GLN GLN TRP GLN ALA GLN GLN ALA ALA VAL PRO ASN  
 420 425 430  
 VAL PHE SER LYS  
 435

<210> 165

<211> 288

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 165

VAL LYS LYS ILE VAL THR LEU PHE SER ILE VAL PHE LEU ALA LEU LEU  
1 5 10 15  
ALA SER ALA CYS GLY ILE SER HIS SER SER LYS GLN SER GLY GLU SER  
20 25 30  
ILE THR ALA VAL GLY SER SER ALA LEU GLN PRO LEU VAL GLU ALA ALA  
35 40 45  
GLY GLU GLN TYR GLN THR GLU HIS LEU GLY VAL PHE ILE ASN VAL GLN  
50 55 60  
GLY GLY GLY SER GLY THR GLY LEU SER HIS ILE GLN GLN GLY ALA VAL  
65 70 75 80  
ASP ILE GLY GLN GLN ASP LEU PHE ALA GLU GLU LYS PRO GLY ILE LYS  
85 90 95  
ALA ASN ALA LEU VAL ASP HIS LYS VAL ALA VAL VAL GLY ILE ALA PRO  
100 105 110  
ILE VAL ASN PRO LYS VAL GLY VAL LYS ASN VAL SER MET THR GLN LEU  
115 120 125  
GLN GLN ILE PHE LEU GLY GLN ILE THR ASN TRP LYS GLN LEU GLY GLY  
130 135 140  
LYS ASN VAL PRO ILE VAL LEU VAL ASN ARG ALA GLN GLY SER GLY THR  
145 150 155 160  
ARG ALA THR PHE GLU LYS TRP ALA LEU GLU GLY LYS GLN PRO ILE ALA  
165 170 175  
ALA GLN GLU GLN ASP SER THR GLY MET VAL ARG GLN ILE VAL GLY SER  
180 185 190  
THR PRO GLY ALA ILE SER TYR VAL ALA PHE SER TYR VAL ASP LYS THR  
195 200 205  
VAL ARG SER LEU SER VAL ASP GLY VAL ALA PRO THR ASP SER ASN VAL  
210 215 220  
ALA THR ASN ARG TRP HIS ILE TRP SER TYR GLU HIS MET TYR THR LYS  
225 230 235 240  
GLY ARG PRO SER GLY LEU THR LYS ARG PHE LEU THR TYR MET MET SER  
245 250 255  
PRO ALA ILE GLN LYS LYS LEU VAL GLN LYS MET GLY TYR ILE PRO MET  
260 265 270  
THR LYS MET LYS VAL VAL ARG ASN ALA SER GLY GLN ILE SER ARG PRO  
275 280 285

<210> 166

<211> 615

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 166

MET LYS ARG CYS PHE ALA THR TYR ARG ASP ASP ASP ALA GLU GLY GLY  
1 5 10 15  
LYS SER MET LYS LYS ARG SER VAL LEU GLY MET ILE THR LEU ALA THR  
20 25 30  
ALA LEU SER ILE THR LEU VAL ALA CYS GLY ASN LYS SER SER ASN SER  
35 40 45  
SER SER SER THR ALA ASN LYS SER VAL LYS PHE PRO VAL SER TYR ASN  
50 55 60  
ASN THR ALA LYS ALA ILE LYS GLY GLY ASN VAL ASN VAL ALA VAL VAL  
65 70 75 80  
ASN ASP SER PRO PHE LYS GLY VAL PHE ASN GLU GLU LEU TYR THR ASP  
85 90 95  
ALA TYR ASP ASN ASP TYR MET SER PRO ALA ALA GLU SER LEU PHE ALA

100	105	110
TYR ASN SER THR PHE LYS	PHE ASN ASN ASN GLY ALA ALA THR ILE LYS	
115	120	125
GLN ASP ASN SER ALA LYS THR ILE THR VAL THR ILE LYS PRO ASN VAL		
130	135	140
LYS TRP SER ASP GLY GLN PRO VAL VAL ALA ARG ASP LEU VAL TYR ALA		
145	150	155
TYR GLU ILE MET ALA ASN LYS ALA THR LYS SER GLN ARG TYR THR GLU		
165	170	175
SER LEU GLN ASN ILE GLU GLY LEU THR GLU TYR HIS ASP GLY LYS ALA		
180	185	190
ASP THR ILE SER GLY LEU THR MET PRO LYS GLY ASP ASN GLY ASN THR		
195	200	205
MET VAL ILE HIS PHE LYS GLN MET LYS PRO SER PHE ASN THR SER GLY		
210	215	220
ASN GLY TYR PHE LEU GLU SER ALA ALA PRO TYR HIS TYR LEU HIS ASP		
225	230	235
VAL ALA PHE ASP LYS LEU GLU SER SER ASP LYS VAL ARG LYS GLN PRO		
245	250	255
LEU PHE PHE GLY PRO TYR LYS ILE SER LYS VAL VAL ALA GLY GLN SER		
260	265	270
VAL GLU TYR THR PRO ASN GLN TYR TYR TRP LYS GLY LYS PRO SER LEU		
275	280	285
SER LYS ILE THR PHE GLU ASN VAL SER SER ALA SER ILE THR SER ALA		
290	295	300
LEU LYS ASN HIS LYS TYR ASP ILE VAL TYR GLY MET PRO SER ASP SER		
305	310	315
TYR SER ASP TRP LYS ASN ILE SER GLY TYR THR ASN LEU GLY HIS GLN		
325	330	335
SER LEU ALA TYR ASN TYR LEU GLY PHE LYS LEU GLY LYS TRP ASP ASP		
340	345	350
LYS LYS SER GLU ASN VAL TYR ASP PRO ASN SER LYS MET ALA ASN LYS		
355	360	365
SER LEU ARG GLN ALA MET GLY TYR ALA LEU ASN ASN ASP GLN VAL ALA		
370	375	380
ALA LYS PHE TYR ASN GLY THR ARG SER ARG ALA THR THR LEU ILE PRO		
385	390	395
PRO VAL PHE GLY LYS ASP VAL HIS ALA ASP ILE ASP GLY TYR ASP LEU		
405	410	415
ASN ILE ASP LYS ALA ASN SER LEU LEU ASP LYS ALA GLY TYR LYS LYS		
420	425	430
GLY LYS ASP GLY TYR ARG THR ASP PRO LYS GLY LYS LYS LEU THR ILE		
435	440	445
TYR PHE ALA THR MET ALA GLY GLY SER THR ALA GLN PRO LEU ALA GLN		
450	455	460
ASP TYR ILE GLN GLN TRP LYS LYS ILE GLY LEU ARG VAL LYS LEU THR		
465	470	475
THR GLY ARG PRO ILE GLU PHE ASN SER PHE TYR ASP LYS VAL GLN ASN		
485	490	495
ASP SER LYS GLY ILE ASP VAL TYR ALA ALA ALA TRP SER LEU SER SER		
500	505	510
ASP PRO SER PRO MET ASP LEU PHE SER GLN LYS ALA PRO PHE ASN TYR		
515	520	525
THR ARG PHE VAL SER ALA LYS ASN THR LYS LEU LEU ASN ASP ILE ASP		
530	535	540
SER GLN LYS ALA MET ASP PRO ALA TYR ARG ALA LYS ALA LEU LYS ALA		
545	550	555
		560

TRP GLN LYS TYR ALA ASN ASP GLU ALA PHE VAL ILE PRO THR LEU TYR  
565 570 575  
ARG GLN GLU ILE PHE PRO VAL ASN LYS ARG VAL LYS ASN ALA SER VAL  
580 585 590  
ASP TYR ALA SER ALA LYS TYR LEU ASN TRP SER LYS MET THR VAL THR  
595 600 605  
SER ASN SER ARG ALA THR LYS  
610 615

<210> 167  
<211> 320  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 167  
MET TRP LYS THR ILE LEU ARG ARG ILE LEU ILE MET ILE PRO GLN LEU  
1 5 10 15  
ILE LEU LEU SER VAL LEU VAL PHE VAL LEU SER LYS MET MET PRO GLY  
20 25 30  
ASP PRO LEU ALA GLY ASN PHE SER GLN GLY GLN SER ALA ALA GLN MET  
35 40 45  
ALA ALA LEU ARG GLN GLN TYR GLY LEU ASN ASP PRO TRP TYR ILE GLN  
50 55 60  
TYR VAL LYS TRP ILE GLY ASN MET PHE HIS GLY ASP LEU GLY GLN SER  
65 70 75 80  
PHE VAL TYR LYS ARG SER VAL THR GLY LEU ILE GLY GLU ARG ALA ALA  
85 90 95  
ASN THR PHE TRP LEU ALA LEU LEU SER THR VAL ILE LEU TYR VAL ILE  
100 105 110  
ALA ILE PRO ALA GLY VAL ILE ALA GLY ARG TYR GLU GLY SER LYS ARG  
115 120 125  
ASP SER ALA ILE SER ILE ALA SER PHE ILE LEU MET ALA VAL PRO PRO  
130 135 140  
PHE VAL PHE TYR LEU LEU GLY LEU ILE PHE PHE GLY PHE PHE LEU GLN  
145 150 155 160  
TRP PHE PRO THR GLY GLY SER VAL SER SER THR TYR ASN PRO GLY THR  
165 170 175  
LEU GLY TYR VAL TRP ASP ARG ILE TYR HIS MET ILE LEU PRO ALA LEU  
180 185 190  
VAL SER GLY ILE ILE THR THR SER SER THR ILE GLN TYR LEU ARG THR  
195 200 205  
GLY VAL ILE ASP ASN THR HIS GLN ASP PHE VAL ARG THR ALA ARG SER  
210 215 220  
LYS GLY VAL PRO ASP ARG VAL ILE PHE ASN LYS HIS ILE LEU ARG ASN  
225 230 235 240  
SER LEU LEU PRO ILE ALA ALA PHE MET GLY ASN GLN ILE THR MET LEU  
245 250 255  
LEU GLY GLY SER VAL ILE LEU GLU THR VAL PHE SER TYR PRO GLY MET  
260 265 270  
GLY GLN LEU PHE VAL SER SER MET THR SER ARG ASP TYR PRO VAL VAL  
275 280 285  
ILE SER LEU VAL LEU LEU PHE GLY PHE LEU THR LEU LEU GLY ASN LEU  
290 295 300  
LEU SER ASP ILE ILE MET SER ILE VAL ASP PRO ARG ILE ARG ILE GLU  
305 310 315 320

<210> 168

<211> 303  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 168

MET GLN ASN ASN ALA ASN GLU VAL ALA THR ASP THR THR LYS ILE GLU  
 1 5 10 15  
 GLN SER PRO SER ASN PHE LYS VAL ILE LEU ASN GLU PHE ARG LYS ASP  
 20 25 30  
 LYS VAL ALA VAL VAL SER LEU PHE LEU ALA VAL THR ILE ILE LEU ALA  
 35 40 45  
 ALA PHE ILE GLY SER MET LEU PHE ASN VAL GLY GLY ALA THR GLU VAL  
 50 55 60  
 ASN ILE LEU ASP ARG TYR MET ALA PRO GLY THR GLY GLY TYR ILE LEU  
 65 70 75 80  
 GLY THR ASP GLU GLY GLY ARG ASP MET PHE LYS TYR LEU PHE PHE ALA  
 85 90 95  
 ALA ARG ASN SER ILE THR ILE GLY ILE SER VAL ALA LEU ILE ILE GLU  
 100 105 110  
 PHE VAL GLY VAL VAL LEU GLY THR ILE SER GLY TYR PHE GLY GLY LEU  
 115 120 125  
 VAL ASP ALA VAL ILE MET ARG PHE VAL ASP PHE MET MET ILE ILE PRO  
 130 135 140  
 SER LEU LEU VAL ILE ILE VAL LEU VAL THR ILE ILE PRO GLN TYR ASN  
 145 150 155 160  
 VAL ILE THR ILE ILE LEU ILE MET ALA ALA PHE TYR TRP MET THR THR  
 165 170 175  
 THR ARG LEU MET ARG SER LEU VAL LEU SER GLU ALA ARG SER GLU TYR  
 180 185 190  
 VAL MET ALA SER LYS THR SER GLY THR SER ASN LEU LYS ILE MET PHE  
 195 200 205  
 THR GLY VAL LEU PRO ASN ILE SER SER LEU ILE ILE THR ASP LEU THR  
 210 215 220  
 LEU THR ILE ALA SER SER ILE GLY ILE GLU THR ALA LEU SER PHE LEU  
 225 230 235 240  
 GLY PHE GLY LEU PRO MET GLU THR PRO SER LEU GLY THR LEU ILE GLY  
 245 250 255  
 TYR ALA SER ASN PRO ASP LEU ILE PHE ASN ARG TRP TRP VAL TRP PHE  
 260 265 270  
 PRO ALA VAL LEU VAL LEU LEU THR LEU SER LEU SER ILE ASN PHE VAL  
 275 280 285  
 GLY GLN ALA MET ARG ARG ALA ALA ASP SER ARG GLN ARG ARG GLY  
 290 295 300

<210> 169  
 <211> 315  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 169

MET ILE GLU VAL LYS ASN LEU LYS ILE HIS TYR PRO ILE ARG SER GLY  
 1 5 10 15  
 PHE PHE ASN ARG VAL THR ASP HIS VAL LEU ALA VAL ASP GLY ILE ASN  
 20 25 30  
 PHE ASP ILE GLU GLN GLY GLU THR TYR GLY LEU ILE GLY GLU SER GLY  
 35 40 45  
 SER GLY LYS SER THR THR GLY LYS ALA ILE VAL GLY LEU GLU PRO VAL

50

55

60

THR SER GLY SER ILE ILE TYR LYS GLY GLU ASP ILE THR LYS ARG SER  
 65 70 75 80  
 VAL ARG LYS ARG LEU GLN TYR ASN LYS ASP VAL GLN MET ILE PHE GLN  
 85 90 95  
 ASP SER LEU SER SER LEU ASN PRO ARG LYS ARG ILE GLU ASP ILE ILE  
 100 105 110  
 ALA GLU PRO ILE ARG ASN PHE GLN ASN LEU THR LYS ASP GLU GLU ARG  
 115 120 125  
 HIS ARG VAL GLN GLU LEU LEU ASP ILE VAL GLY MET PRO SER ASP ALA  
 130 135 140  
 LEU TYR LYS TYR PRO HIS GLU PHE SER GLY GLY GLN ARG GLN ARG ILE  
 145 150 155 160  
 GLY VAL ALA ARG ALA MET ALA THR ASN PRO LYS LEU ILE ILE ALA ASP  
 165 170 175  
 GLU PRO VAL SER ALA LEU ASP LEU SER VAL GLN ALA GLN VAL LEU ASN  
 180 185 190  
 PHE MET LYS ARG ILE GLN GLU GLU TYR ASN ILE SER TYR LEU PHE ILE  
 195 200 205  
 SER HIS ASP LEU GLY VAL VAL LYS HIS MET CYS LYS LYS MET ALA ILE  
 210 215 220  
 MET HIS ARG GLY ARG PHE VAL GLU ILE GLY THR ARG GLU ASP ILE TYR  
 225 230 235 240  
 GLN HIS PRO GLN HIS ILE TYR THR LYS ARG LEU LEU SER ALA ILE PRO  
 245 250 255  
 ASP VAL ASN PRO ASP ASP ARG ALA GLN ASN LYS GLU HIS ARG ARG GLU  
 260 265 270  
 VAL GLU ARG ILE PHE LYS GLU GLU GLU SER LYS TYR TYR SER LYS GLU  
 275 280 285  
 GLY ARG VAL LEU ASP LEU GLN LYS ILE SER ASP THR HIS TYR VAL ALA  
 290 295 300  
 LEU PRO ASP SER THR MET LYS GLY VAL HIS ASP  
 305 310 315

&lt;210&gt; 170

&lt;211&gt; 462

&lt;212&gt; PRT

&lt;213&gt; LACTOBACILLUS RHAMNOSUS

&lt;400&gt; 170

MET ALA THR SER ILE THR ALA TYR ASP THR ILE ALA ALA ILE SER THR  
 1 5 10 15  
 PRO PRO GLY GLU GLY ALA ILE SER ILE VAL ARG LEU SER GLY GLU THR  
 20 25 30  
 ALA VAL ALA THR ALA ASN LYS VAL PHE LYS GLY LYS ASN LEU THR GLN  
 35 40 45  
 VAL LYS SER HIS THR ILE HIS TYR GLY HIS ILE VAL ASP PRO GLU THR  
 50 55 60  
 GLY ASP LEU ILE ASP GLU VAL MET VAL SER VAL MET LEU ALA PRO LYS  
 65 70 75 80  
 THR PHE THR ARG GLU ASP VAL VAL GLU ILE ASN CYS HIS GLY GLY ILE  
 85 90 95  
 VAL ALA THR ASN ARG ILE LEU GLN LEU LEU LEU GLY GLY ALA ARG  
 100 105 110  
 MET ALA GLU PRO GLY GLU PHE THR LYS ARG ALA PHE LEU ASN GLY ARG  
 115 120 125

ILE ASP LEU THR GLU ALA GLU SER VAL MET ASP LEU ILE ARG ALA LYS  
 130 135 140  
 THR ASP ARG ALA MET GLN VAL ALA VAL ASN GLN LEU ASP GLY ASN LEU  
 145 150 155 160  
 HIS HIS LEU ILE LYS GLN LEU ARG GLN GLU ILE LEU GLU VAL LEU ALA  
 165 170 175  
 GLN VAL GLU VAL ASN ILE ASP TYR PRO GLU TYR ASP THR ASP GLU MET  
 180 185 190  
 THR THR LYS MET LEU LEU GLU LYS ALA GLN THR VAL LYS LYS ALA ILE  
 195 200 205  
 GLU GLN LEU LEU THR THR ALA SER GLN GLY LYS VAL LEU ARG GLU GLY  
 210 215 220  
 LEU ALA THR ALA ILE VAL GLY ARG PRO ASN VAL GLY LYS SER SER LEU  
 225 230 235 240  
 LEU ASN HIS MET LEU HIS GLU ASP LYS ALA ILE VAL THR ASP VAL ALA  
 245 250 255  
 GLY THR THR ARG ASP VAL LEU GLU GLU TYR VAL ASN VAL ARG GLY VAL  
 260 265 270  
 PRO LEU LYS LEU VAL ASP THR ALA GLY ILE HIS ASP THR THR ASP LYS  
 275 280 285  
 VAL GLU LYS ILE GLY VAL GLU ARG SER ARG GLN ALA ILE THR GLN ALA  
 290 295 300  
 ASP LEU ILE LEU LEU VAL LEU ASP GLN SER GLU PRO LEU THR THR GLU  
 305 310 315 320  
 ASP LYS GLN LEU LEU ALA ALA THR ALA ASP LYS LYS ARG ILE ILE VAL  
 325 330 335  
 LEU ASN LYS GLN ASP LEU PRO ALA ARG LEU ASP THR THR ALA LEU LEU  
 340 345 350  
 GLN LEU VAL ASP ALA ASP GLU ILE ILE LYS THR ALA ILE PRO THR SER  
 355 360 365  
 ASP GLY MET ASP ALA LEU ASP GLU ARG ILE ALA LYS LEU PHE PHE GLY  
 370 375 380  
 GLY ILE GLU ASN SER GLN GLY THR VAL MET VAL SER ASN ALA ARG GLN  
 385 390 395 400  
 ILE GLY LEU LEU ARG GLN ALA SER LYS SER LEU ASP ALA VAL MET ALA  
 405 410 415  
 GLY ILE HIS ALA GLY MET PRO ILE ASP LEU VAL GLN ILE ASP MET THR  
 420 425 430  
 ALA ALA TRP ASP LYS LEU GLY GLU ILE THR GLY GLU SER ALA PRO ASP  
 435 440 445  
 GLU LEU ILE THR GLN LEU PHE SER GLN PHE CYS LEU GLY LYS  
 450 455 460

<210> 171

<211> 639

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 171

MET LEU GLY GLY LYS GLN MET PRO GLU VAL LYS LYS PHE GLU ALA GLY  
 1 5 10 15  
 THR TYR ASP VAL ILE VAL VAL GLY ALA GLY HIS ALA GLY CYS GLU ALA  
 20 25 30  
 ALA LEU ALA ALA ALA ARG MET GLY GLU LYS THR LEU LEU LEU THR ILE  
 35 40 45  
 SER LEU GLU MET LEU ALA PHE MET PRO CYS ASN PRO SER LEU GLY GLY  
 50 55 60



PRO ALA LYS GLY ILE VAL VAL ARG GLU ILE ASP ALA LEU GLY GLY GLU  
 65 70 75 80  
 MET GLY LYS ASN ILE ASP ARG THR TYR ILE GLN MET ARG MET LEU ASN  
 85 90 95  
 THR GLY LYS GLY PRO ALA VAL ARG ALA LEU ARG ALA GLN ALA ASP LYS  
 100 105 110  
 ALA ALA TYR HIS ARG SER MET LYS HIS VAL ILE GLU ASP THR PRO HIS  
 115 120 125  
 LEU ASP LEU ARG GLN GLY LEU ALA THR GLU VAL LEU VAL GLU ASP GLY  
 130 135 140  
 LYS ALA VAL GLY ILE VAL ALA ALA THR GLY ALA ILE TYR ARG ALA LYS  
 145 150 155 160  
 SER ILE VAL LEU THR ALA GLY THR SER SER ARG GLY LYS ILE ILE ILE  
 165 170 175  
 GLY GLU LEU MET TYR SER SER GLY PRO ASN ASN SER LEU PRO SER ILE  
 180 185 190  
 LYS LEU SER GLU ASN LEU GLU GLN LEU GLY PHE LYS LEU ARG ARG PHE  
 195 200 205  
 LYS THR GLY THR PRO PRO ARG VAL ASN GLY ASN THR ILE ASP PHE SER  
 210 215 220  
 LYS THR GLU GLU GLN PRO GLY ASP LYS THR PRO ASN HIS PHE SER PHE  
 225 230 235 240  
 THR THR PRO ASP SER VAL TYR LEU LYS ASP GLN LEU SER CYS TRP MET  
 245 250 255  
 THR TYR THR ASN ALA THR THR HIS GLN ILE ILE ARG GLU ASN LEU ASP  
 260 265 270  
 ARG ALA PRO MET PHE SER GLY VAL ILE LYS GLY VAL GLY PRO ARG TYR  
 275 280 285  
 CYS PRO SER ILE GLU ASP LYS ILE VAL ARG PHE ALA ASP LYS PRO ARG  
 290 295 300  
 HIS GLN LEU PHE LEU GLU PRO GLU GLY ARG ASP THR SER GLU TYR TYR  
 305 310 315 320  
 VAL GLY ASP PHE SER THR SER MET PRO GLU GLU ILE GLN LEU LYS MET  
 325 330 335  
 LEU HIS SER VAL ALA GLY LEU GLU HIS ALA GLU LEU MET ARG ALA GLY  
 340 345 350  
 TYR ALA ILE GLU TYR ASP VAL ILE GLU PRO TRP GLN LEU LYS ALA THR  
 355 360 365  
 LEU GLU THR LYS VAL VAL GLU ASN LEU TYR THR ALA GLY GLN MET ASN  
 370 375 380  
 GLY THR SER GLY TYR GLU GLU ALA ALA GLY GLN GLY ILE VAL ALA GLY  
 385 390 395 400  
 ILE ASN ALA ALA ARG ARG ALA GLN GLY LYS GLY PRO PHE THR LEU LYS  
 405 410 415  
 ARG SER ASP ALA TYR ILE GLY VAL MET ILE ASP ASP LEU VAL THR LYS  
 420 425 430  
 GLY THR ASN GLU PRO TYR ARG LEU LEU THR SER ARG ALA GLU TYR ARG  
 435 440 445  
 LEU LEU LEU ARG HIS ASP ASN ALA ASP LEU ARG LEU THR PRO MET GLY  
 450 455 460  
 HIS GLU LEU GLY LEU ILE SER ASP GLN ARG TYR ALA VAL PHE LEU ALA  
 465 470 475 480  
 LYS ARG GLN ALA ILE THR ASP GLU LEU ALA ARG LEU GLU HIS THR ARG  
 485 490 495  
 LEU LYS PRO LYS ASP VAL ASN PRO TRP LEU GLU ALA HIS HIS PHE ALA  
 500 505 510  
 SER LEU LYS ASP GLY VAL LEU ALA SER ASP PHE LEU LYS ARG PRO GLU

515                      520                      525  
 ILE ASN TYR GLN THR LEU GLU GLN PHE LEU PRO GLU ASN PRO THR LEU  
 530                      535                      540  
 ASP HIS ARG VAL ILE GLU GLN VAL GLU ILE GLN ILE LYS TYR ALA GLY  
 545                      550                      555                      560  
 TYR ILE ALA LYS GLU GLU ALA LYS CYS ALA LYS LEU LYS ARG LEU GLU  
 565                      570                      575  
 GLY LYS LYS ILE PRO ALA ARG ILE ASN TYR GLU ALA ILE ASN GLY LEU  
 580                      585                      590  
 ALA THR GLU ALA ARG GLN LYS LEU VAL LYS ILE GLN PRO GLU THR ILE  
 595                      600                      605  
 ALA GLN ALA SER ARG ILE SER GLY VAL ASN PRO ALA ASP VAL ALA ILE  
 610                      615                      620  
 LEU SER VAL TYR ILE GLU GLN GLY ARG ILE SER LYS VAL ALA GLN  
 625                      630                      635

<210> 172  
 <211> 590  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 172  
 MET GLU ALA SER VAL MET THR GLU LYS ILE ASN ALA ALA ASP ALA MET  
 1                      5                      10                      15  
 ILE LYS VAL LEU GLU ASP TRP GLY ILE HIS ASN ILE TYR GLY LEU PRO  
 20                      25                      30  
 GLY GLY SER PHE ASP SER THR MET ASN ALA LEU TYR ASN ARG ARG HIS  
 35                      40                      45  
 THR ILE ASN TYR VAL GLN VAL ARG HIS GLU GLU VAL GLY ALA LEU ALA  
 50                      55                      60  
 ALA ALA GLY GLU ALA LYS VAL THR GLY ARG ILE GLY ALA THR PHE GLY  
 65                      70                      75                      80  
 SER ALA GLY PRO GLY ALA VAL HIS LEU LEU ASN GLY LEU TYR ASP ALA  
 85                      90                      95  
 GLN TYR ASP HIS VAL PRO VAL LEU ALA LEU VAL GLY GLN VAL PRO THR  
 100                      105                      110  
 ALA ALA MET ASN THR ASN TYR PHE GLN GLU MET ASN GLU ASN PRO MET  
 115                      120                      125  
 PHE ALA ASP VAL SER VAL TYR ASN ARG THR ALA MET THR ALA ALA GLN  
 130                      135                      140  
 LEU PRO HIS VAL VAL ASP GLU ALA ILE ARG GLN ALA TYR LYS TYR GLN  
 145                      150                      155                      160  
 GLY VAL ALA VAL VAL THR ILE PRO LYS ASP LEU GLY TRP GLN GLU ILE  
 165                      170                      175  
 ASP ASP ASN TYR VAL SER SER ALA ASN LEU TYR GLN LYS PRO LEU LEU  
 180                      185                      190  
 PRO GLU PRO ASP PRO GLU GLN VAL ALA THR ALA TRP SER ILE LEU LYS  
 195                      200                      205  
 ASP ALA LYS LYS PRO ILE LEU TYR VAL GLY ASN GLY ALA ARG GLY ALA  
 210                      215                      220  
 ARG ASP GLU ILE ILE ALA PHE SER GLU LYS THR HIS ILE PRO ILE ILE  
 225                      230                      235                      240  
 THR THR ALA LEU ALA LYS GLY VAL VAL PRO ASP ASP TYR LYS ALA ASN  
 245                      250                      255  
 MET GLY SER ALA GLY ARG VAL ALA SER LYS PRO GLY VAL GLU VAL ALA  
 260                      265                      270  
 ARG GLY ALA ASP THR VAL LEU PHE LEU GLY SER ASP PHE PRO PHE GLN

275 280 285  
 PRO TYR PHE ILE ALA PRO ASN ALA LYS TYR ILE GLN VAL ASP ILE ASP  
 290 295 300  
 ALA SER LYS PHE GLY ARG ARG HIS THR VAL ASP LEU ALA VAL LEU ALA  
 305 310 315 320  
 ASP ALA LYS LYS PHE ILE LYS ALA LEU THR GLU LYS ALA ASP ALA VAL  
 325 330 335  
 PRO GLU THR ALA TRP TYR ARG ALA ALA VAL ALA ASN LYS ALA ASN TRP  
 340 345 350  
 ALA GLU TRP MET THR SER PHE GLU ASP ASP SER GLN THR PRO LEU ARG  
 355 360 365  
 VAL GLU PRO ILE PHE LYS LEU ILE ASN GLU MET ALA ASP LYS ASP ALA  
 370 375 380  
 VAL PHE GLN VAL ASP VAL GLY ASN VAL THR ILE ASN GLY MET ARG TYR  
 385 390 395 400  
 LEU LYS ALA ASN ASP ASN GLN ILE PHE THR THR SER GLY TRP TYR ALA  
 405 410 415  
 THR MET GLY TYR ALA VAL PRO ALA ALA ILE GLY ALA GLN ALA GLU PHE  
 420 425 430  
 PRO ASP ARG GLN VAL TRP SER ILE SER GLY ASP GLY GLY PHE ALA MET  
 435 440 445  
 VAL MET GLN ASP ILE MET THR GLN VAL LYS TYR HIS MET PRO ILE ILE  
 450 455 460  
 ASN ILE VAL LEU THR ASN GLU SER LEU GLY PHE ILE GLU ALA GLU GLN  
 465 470 475 480  
 ASP ASP THR ARG GLN PRO HIS SER GLY VAL ASP LEU ILE ASP ALA ASP  
 485 490 495  
 TYR GLY LYS ALA ALA GLU ALA MET GLY ALA GLN GLY PHE GLU VAL HIS  
 500 505 510  
 ASN LEU ASP GLU LEU LYS ALA ALA PHE ALA LYS ALA LYS ASP ARG LYS  
 515 520 525  
 GLY PRO VAL VAL ILE ASP VAL LYS ILE SER ASP LEU ARG PRO ILE PRO  
 530 535 540  
 VAL GLU GLN LEU VAL LEU ASP LYS GLN THR GLN ASP PRO GLU ALA VAL  
 545 550 555 560  
 ASP ALA PHE VAL LYS LYS TYR HIS ALA GLU THR LEU ILE PRO PHE GLY  
 565 570 575  
 SER TYR SER ARG MET LEU LYS ARG GLN LEU GLN THR PHE ASN  
 580 585 590

<210> 173

<211> 478

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 173

MET ALA ASP PRO LYS GLY PHE LEU LYS TYR GLN ARG LYS ASP ASN PRO  
 1 5 10 15  
 MET ARG PRO ILE MET GLN ARG VAL LYS ASP PHE ASP ALA LEU GLU LEU  
 20 25 30  
 ASP VAL SER MET GLU GLU ARG ARG LYS GLN ALA ALA ARG CYS MET ASN  
 35 40 45  
 CYS GLY ILE PRO PHE CYS HIS HIS GLY VAL PHE TYR GLY GLY GLY ARG  
 50 55 60  
 ALA VAL SER GLY CYS PRO ASN ASP ASN LEU ILE PRO GLU TRP ASN ASP  
 65 70 75 80

LEU VAL TYR ARG ALA GLU ASP LYS ARG ALA PHE GLU ARG LEU SER ARG  
                   85                  90                  95  
 SER ASN MET LEU PRO ASP MET THR GLY ARG VAL CYS PRO ALA PRO CYS  
                   100                  105                  110  
 GLU VAL SER CYS VAL GLN ALA LEU ASN GLY PRO GLY VAL THR ILE ARG  
                   115                  120                  125  
 ASN ASN GLU LYS TYR ILE ILE GLU GLN ALA PHE LYS ASN GLY TRP VAL  
                   130                  135                  140  
 ILE ALA SER GLY LYS PRO LEU GLN ARG THR GLY LYS LYS VAL ALA VAL  
 145                  150                  155                  160  
 ILE GLY SER GLY PRO ALA GLY ILE SER ALA ALA TRP ARG LEU ASN GLN  
                   165                  170                  175  
 LEU GLY HIS SER VAL THR ILE PHE GLU ARG ASP ASP ARG PHE GLY GLY  
                   180                  185                  190  
 PHE LEU MET TYR GLY ILE PRO ASN MET LYS LEU PRO LYS THR VAL VAL  
                   195                  200                  205  
 GLN ARG ARG ILE GLU THR LEU LYS GLN VAL GLY ILE GLU LEU VAL ALA  
                   210                  215                  220  
 ASN THR GLU VAL GLY LYS ASP ILE SER ALA ASP GLU LEU LYS ARG GLN  
 225                  230                  235                  240  
 PHE ASP ARG VAL ILE VAL CYS THR GLY ALA ARG GLN ALA ARG GLU LEU  
                   245                  250                  255  
 GLN VAL PRO GLY ARG GLU LEU GLY GLY ILE VAL GLN ALA VAL ASP PHE  
                   260                  265                  270  
 LEU LYS THR ALA THR GLN THR VAL LEU LYS ASP GLY THR GLN ALA ASN  
                   275                  280                  285  
 THR GLN LEU LYS GLY LYS ARG VAL LEU VAL LEU GLY GLY GLY ASP THR  
                   290                  295                  300  
  
 GLY ASN ASP CYS ILE ALA THR ALA ILE ARG GLN GLY CYS ALA GLY VAL  
 305                  310                  315                  320  
 THR GLN LEU GLU ILE THR PRO ALA LEU PRO PRO LYS ARG PRO ALA GLY  
                   325                  330                  335  
  
 ASN GLN TRP PRO GLU TRP PRO MET THR LEU LYS THR GLY TYR GLY GLN  
                   340                  345                  350  
 LYS GLU ALA LYS ALA LEU PHE GLY GLY ASP VAL THR THR TYR ALA ALA  
                   355                  360                  365  
 THR VAL THR ALA PHE PHE GLY GLU HIS GLY GLN VAL SER GLU ALA GLU  
                   370                  375                  380  
 ILE SER GLN VAL ASP HIS PHE LYS PRO ILE ALA GLY THR GLU LYS LYS  
 385                  390                  395                  400  
 VAL LYS VAL ASP LEU VAL VAL LEU ALA MET GLY PHE THR GLY PRO GLU  
                   405                  410                  415  
 ALA ASP VAL PHE ASP ALA PHE GLY ILE THR ALA LYS ASN ALA ASN PHE  
                   420                  425                  430  
 THR THR ASN ASP THR GLN ILE TYR VAL ALA GLY ASP CYS ARG ARG GLY  
                   435                  440                  445  
 PRO SER LEU VAL ILE TRP GLY ILE HIS GLU GLY ARG MET CYS ALA GLU  
                   450                  455                  460  
 LYS VAL ASP ALA SER LEU GLN THR LEU ALA SER GLU ALA LEU  
 465                  470                  475

<210> 174

<211> 163

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 174

MET THR ALA PHE LEU TRP ALA GLN ASP ARG ASP GLY LEU ILE GLY LYS  
1 5 10 15  
ASP GLY HIS LEU PRO TRP HIS LEU PRO ASP ASP LEU HIS TYR PHE ARG  
20 25 30  
ALA GLN THR VAL GLY LYS ILE MET VAL VAL GLY ARG ARG THR TYR GLU  
35 40 45  
SER PHE PRO LYS ARG PRO LEU PRO GLU ARG THR ASN VAL VAL LEU THR  
50 55 60  
HIS GLN GLU ASP TYR GLN ALA PRO GLY ALA VAL VAL VAL HIS ASP VAL  
65 70 75 80  
ALA ALA VAL PHE ALA TYR ALA LYS GLN HIS PRO ASP GLN GLU LEU VAL  
85 90 95  
ILE ALA GLY GLY ALA GLN VAL PHE THR ALA PHE LYS ASP ASP VAL ASP  
100 105 110  
THR LEU LEU VAL THR ARG LEU ALA GLY SER PHE GLU GLY ASP THR LYS  
115 120 125  
MET ILE PRO LEU ASN TRP ASP ASP PHE THR LYS VAL SER SER ARG THR  
130 135 140  
VAL GLU ASP THR ASN PRO ALA LEU THR HIS THR TYR GLU VAL TRP GLN  
145 150 155 160  
LYS LYS ALA

<210> 175

<211> 800

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 175

MET HIS THR LEU THR ILE ASP GLY SER GLN LEU GLN LEU GLU GLN ASN  
1 5 10 15  
GLU ALA ASN THR ILE LYS GLY PHE GLY LEU LEU SER CYS ASN ASN THR  
20 25 30  
SER ARG LEU LEU MET ASP TYR LYS TRP GLU HIS PRO GLN VAL TYR GLN  
35 40 45  
GLN VAL LEU GLN HIS LEU PHE GLY GLY GLN HIS PRO LEU MET ARG MET  
50 55 60  
LEU LYS VAL GLU LEU GLY SER ASP SER ASN THR SER CYS GLY THR GLU  
65 70 75 80  
PRO ALA PRO GLN ARG ALA ALA ASP GLU PRO ALA ASN VAL ALA ARG GLY  
85 90 95  
MET GLY PHE GLN LEU ILE ALA ASP ALA LYS LYS ILE GLN PRO ASP LEU  
100 105 110  
LYS THR CYS MET LEU ARG TRP ALA GLU PRO GLY PHE LEU ARG PRO SER  
115 120 125  
TRP ARG GLN VAL LYS SER ASP ASP PRO ASP GLU LYS VAL PRO THR GLU  
130 135 140  
ALA PHE GLU ALA MET TYR GLN TYR TYR LYS GLN THR VAL ILE ALA ALA  
145 150 155 160  
TRP GLN ALA TYR GLY TYR LEU PHE ASP TYR ILE ASP PRO ASP ARG ASN  
165 170 175  
GLU THR LYS HIS PRO MET TYR ARG TYR LEU LYS TRP PHE ALA ASN ARG  
180 185 190  
LEU LYS THR ASP GLN ALA ASP PHE PRO LYS GLY PHE PRO VAL ALA ASP

195	200	205
TYR HIS ALA ILE LYS LEU ILE THR SER ASP GLN ASN TYR GLY THR ASP		
210	215	220
MET GLY THR ALA LEU LEU ASN ASP PRO GLU LEU GLN ALA VAL ILE PRO		
225	230	235
ALA VAL GLY TYR HIS TYR ASN THR ASP ASP GLY PRO ASP LYS PRO PHE		
245	250	255
THR LYS ILE ALA ASP GLN LEU HIS LYS GLU VAL TRP TYR SER GLU GLY		
260	265	270
ILE ALA PRO VAL THR PHE GLY THR LEU ARG THR GLN ASP THR THR GLY		
275	280	285
ILE GLY ILE GLY GLY PRO MET SER ALA LEU ASP VAL ALA ASN ARG LEU		
290	295	300
VAL LYS SER TYR ALA ARG SER ARG ARG SER LEU TYR ILE PHE GLN PRO		
305	310	315
ALA ILE GLY GLY LEU TYR PRO GLY ALA LYS TYR PRO GLY LYS GLN LEU		
325	330	335
LEU GLU MET ASP THR PRO TRP SER GLY TYR PHE GLN GLN ASP THR VAL		
340	345	350
ALA LEU ALA VAL MET HIS HIS PHE THR ASP PHE ALA VAL THR GLY TRP		
355	360	365
ARG ASP GLN THR ALA ALA LYS ASN TRP ARG TYR VAL PRO SER ALA THR		
370	375	380
VAL SER GLU VAL ALA GLY THR GLU ASN LEU THR GLN ALA PHE GLY ALA		
385	390	395
ALA SER VAL MET THR LEU VAL ALA PRO ASP GLU THR ASP TYR THR VAL		
405	410	415
MET LEU ILE ASN ASP THR SER ALA PRO GLN THR TYR GLN ILE THR VAL		
420	425	430
LYS ASN LEU ALA ALA ALA THR LYS PRO LEU TYR VAL TRP GLN THR TRP		
435	440	445
ALA ASP ASP ALA GLY LYS ILE HIS ASP ARG GLU LYS THR THR THR LEU		
450	455	460
THR PRO VAL ASN GLY ASN VAL THR VAL THR ILE GLU PRO ARG ALA ILE		
465	470	475
ILE SER ALA THR THR ALA ASP PHE GLN PRO GLN ALA LEU LEU PRO ASN		
485	490	495
PRO ASP VAL LYS THR ASP GLN PRO LEU GLN GLN ASP PRO GLU ASN HIS		
500	505	510
VAL LEU PHE HIS ASP ASP TYR SER TYR ALA ASP MET PRO ALA ASP TYR		
515	520	525
LEU THR ARG ARG GLY GLY THR PRO LYS TYR THR THR ASP MET ASP GLY		
530	535	540
ALA PHE GLU VAL VAL GLU GLN ASP GLY LYS ARG GLY LEU GLN GLN LYS		
545	550	555
ILE THR GLU GLN SER ARG ALA LEU ALA TRP GLU THR GLN THR ASP PRO		
565	570	575
ASN PHE THR VAL GLY ASP ILE ARG TRP LEU ASN TYR ALA ALA ALA LEU		
580	585	590
LYS PHE THR PHE ASP THR THR THR ARG GLN ASN THR VAL SER ALA ASN		
595	600	605
TYR ILE GLY LEU GLY VAL ARG SER VAL ASP ASP PHE GLU GLY SER LEU		
610	615	620
PHE SER ALA PRO TYR VAL ALA THR LEU THR ILE GLY GLY LYS LEU ARG		
625	630	635
PHE TYR VAL ARG GLY SER LEU ALA ALA THR LEU ASP VAL PRO VAL PHE		
645	650	655

ASP ALA GLU VAL SER HIS GLU LEU ILE VAL GLU ALA THR ASP ARG TYR  
           660                  665                  670  
 VAL THR VAL GLN VAL ASP GLY GLN THR TYR VAL THR TYR ASP ASP PRO  
           675                  680                  685  
 SER ASP GLN PRO GLY LEU ALA GLY GLN VAL LYS VAL GLY THR GLY TYR  
           690                  695                  700  
 PHE LYS THR VAL ILE GLN ALA LEU THR VAL THR SER THR SER ALA PRO  
 705                  710                  715                  720  
 ALA VAL LEU GLY HIS ARG ARG ASP ASP LEU ASP ALA SER LEU THR PHE  
           725                  730                  735  
 SER ASP ASP GLN TRP GLU ARG PHE ALA ALA ARG PHE PRO HIS ALA TRP  
           740                  745                  750  
 GLU ARG SER GLN SER ILE GLY GLU LYS GLY ALA THR VAL ASP PHE ASP  
           755                  760                  765  
 VAL GLU GLY THR GLY PHE VAL LEU PHE GLY THR PRO SER THR ARG GLN  
           770                  775                  780  
 VAL ALA CYS SER TRP PRO LEU THR GLY GLY CYS ARG LYS TRP CYS ARG  
 785                  790                  795                  800

<210> 176

<211> 277

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 176

MET LEU PRO ALA LEU PRO ASN THR LYS GLU LEU THR LEU MET SER ASN  
 1                  5                  10                  15  
 LEU ALA ALA ILE PHE LYS ASN HIS LYS ALA PHE ILE PRO PHE VAL VAL  
           20                  25                  30  
 ALA ASP ASP PRO ASP PHE ASP THR THR VAL LYS ASN ILE VAL ALA LEU  
           35                  40                  45  
 ALA HIS GLY GLY ALA ASP ILE VAL GLU LEU GLY ILE PRO PHE SER ASP  
           50                  55                  60  
 PRO VAL ALA ASP GLY PRO VAL ILE GLN ALA ALA ASP LEU ARG ALA PHE  
 65                  70                  75                  80  
 ALA ALA ASN VAL ARG THR LYS THR VAL PHE GLU ILE VAL GLU ALA ALA  
           85                  90                  95  
 ARG LYS GLU THR THR VAL PRO ILE VAL PHE LEU THR TYR LEU ASN ILE  
           100                  105                  110  
 VAL PHE LYS TYR GLY TYR ASP ALA PHE LEU LYS ARG CYS ALA GLU LEU  
           115                  120                  125  
 LYS VAL SER GLY LEU VAL ILE PRO ASP LEU PRO TYR GLU SER ARG ALA  
           130                  135                  140  
 GLU ILE VAL PRO PHE ALA GLU LYS TYR GLY ILE ASP ILE ILE PRO LEU  
 145                  150                  155                  160  
 ILE THR PRO THR SER GLY HIS ARG ILE GLU LYS ILE ALA LYS SER ALA  
           165                  170                  175  
 SER GLY PHE ILE TYR VAL VAL SER SER VAL GLY ILE THR GLY GLU ARG  
           180                  185                  190  
 ASP GLU PHE PHE THR GLY LEU LYS ALA LEU VAL ALA GLU ILE LYS ARG  
           195                  200                  205  
 SER THR ASP VAL PRO THR ALA ILE GLY PHE GLY ILE HIS THR PRO GLN  
           210                  215                  220  
 GLN ALA GLN THR MET ALA SER ILE ALA ASP GLY VAL ILE ILE GLY SER  
 225                  230                  235                  240  
 ALA ILE VAL ASP ILE VAL ALA LYS GLU ALA GLN ASN ALA PRO ALA ALA  
           245                  250                  255

ILE GLU GLN PHE THR ARG ALA ILE ARG ALA ALA VAL ASP THR GLN THR  
260 265 270  
GLU SER VAL VAL LYS  
275

<210> 177  
<211> 449  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 177  
MET LEU PRO ALA PRO PHE LYS SER SER THR LEU LEU SER LEU THR CYS  
1 5 10 15  
PRO ALA ALA LEU LYS LEU PRO VAL THR LYS MET ARG ILE LYS PHE ILE  
20 25 30  
ASN LEU LEU LYS THR GLN LYS ARG LYS SER LEU MET LYS THR LEU ASN  
35 40 45  
GLU THR ALA GLN PRO THR ASN ARG ALA GLY ARG TYR GLY ASN ASP PHE  
50 55 60  
GLY GLY GLN TYR ILE PRO GLU THR LEU MET THR GLU LEU GLU LYS ILE  
65 70 75 80  
THR ALA ALA PHE ASN THR LEU LYS ASP ASP PRO GLN PHE LYS ALA GLU  
85 90 95  
LEU ASN ASP LEU LEU VAL ASN TYR ALA ASN ARG PRO SER LEU LEU TYR  
100 105 110  
TYR ALA LYS ASN MET THR GLU ASP LEU GLY GLY ALA LYS ILE TYR LEU  
115 120 125  
LYS ARG GLU ASP LEU ASN HIS THR GLY ALA HIS LYS ILE ASN ASN VAL  
130 135 140  
ILE GLY GLN ALA LEU LEU ALA LYS HIS LEU GLY LYS THR ARG LEU ILE  
145 150 155 160  
ALA GLU THR GLY ALA GLY GLN HIS GLY VAL ALA THR ALA THR ILE ALA  
165 170 175  
ALA LEU MET GLY MET GLU CYS GLU ILE PHE MET GLY LYS GLU ASP THR  
180 185 190  
ASP ARG GLN LYS LEU ASN VAL TYR ARG MET THR LEU LEU GLY ALA LYS  
195 200 205  
VAL HIS SER VAL THR SER GLY SER MET VAL LEU LYS ASP ALA VAL ASN  
210 215 220  
ALA ALA LEU GLN GLU TRP ALA SER ARG SER ASP ASP THR PHE TYR VAL  
225 230 235 240  
LEU GLY SER ALA VAL GLY PRO ALA PRO PHE PRO GLU MET VAL LYS HIS  
245 250 255  
PHE GLN SER VAL ILE SER ILE GLU SER LYS GLN GLN LEU GLN ALA LYS  
260 265 270  
GLU GLY GLN LEU PRO ASP MET VAL VAL ALA CYS VAL GLY GLY GLY SER  
275 280 285  
ASN ALA ILE GLY SER PHE ALA ALA TYR ILE ASP GLU PRO SER VAL GLN  
290 295 300  
LEU VAL GLY VAL GLU ALA ALA GLY LYS GLY VAL ASP THR ALA ARG THR  
305 310 315 320  
ALA ALA THR ILE GLU ARG GLY SER VAL GLY ILE PHE HIS GLY MET LYS  
325 330 335  
SER LEU PHE MET GLN ASN GLU ASP GLY GLN ILE ASP PRO VAL TYR SER  
340 345 350  
ILE SER ALA GLY LEU ASP TYR PRO GLY VAL GLY PRO GLU HIS ALA ALA  
355 360 365



LEU ALA GLU ALA GLY ARG ALA GLN TYR VAL GLY ILE THR ASP ASP GLU  
 370 375 380  
 ALA VAL GLN ALA PHE ALA TYR ILE ALA ARG GLN GLU GLY ILE VAL ALA  
 385 390 395 400  
 ALA VAL GLU SER CYS HIS ALA ILE ALA TYR VAL GLU LYS ILE ALA PRO  
 405 410 415  
 THR MET ALA LYS ASP GLN ILE ILE ILE CYS THR LEU SER GLY ARG GLY  
 420 425 430  
 ASP LYS ASP VAL ALA SER ILE ALA LYS TYR LYS GLY VAL ASP VAL ASP  
 435 440 445  
 GLU

<210> 178  
 <211> 259  
 <212> PRT  
 <213> LACTOBACILLUS RHAMNOSUS

<400> 178  
 MET ILE LEU ASP ASP LEU VAL ALA ALA THR ARG ILE ARG LEU ALA ARG  
 1 5 10 15  
 HIS GLN GLN PRO GLN SER LEU THR GLU LEU LYS ARG ILE VAL ALA HIS  
 20 25 30  
 GLN PRO SER THR THR LYS SER ASP PHE LEU THR ILE LEU LYS GLN PRO  
 35 40 45  
 GLY LEU HIS VAL ILE ALA GLU VAL LYS LYS ALA SER PRO SER LYS GLY  
 50 55 60  
 THR ILE VAL ALA ASN PHE PRO TYR MET ALA ILE ALA GLN ALA TYR GLU  
 65 70 75 80  
 GLN ALA GLY VAL ASP ALA ILE SER VAL LEU THR GLU PRO ASP TYR PHE  
 85 90 95  
 ASN GLY HIS LEU ARG TYR LEU LYS THR ILE SER GLN GLN VAL SER VAL  
 100 105 110  
 PRO THR LEU ARG LYS ASP PHE THR ILE ASP PRO TYR MET ILE TYR GLU  
 115 120 125  
 ALA LYS ALA ASN GLY ALA SER ILE ILE LEU LEU ILE VAL ALA ILE LEU  
 130 135 140  
 THR ASP GLN GLN LEU ARG THR PHE ARG GLN LEU ALA GLU ASP LEU GLY  
 145 150 155 160  
 MET GLN ALA ILE VAL GLU ALA TYR THR ALA GLU GLU VAL THR ARG ALA  
 165 170 175  
 LEU GLN SER GLY ALA LYS ILE ILE GLY ILE ASN ASN ARG ASN LEU LYS  
 180 185 190  
 ASN PHE GLN VAL ASP PHE THR ASN SER LEU LYS LEU ARG ALA MET VAL  
 195 200 205  
 PRO ASP PRO ILE PRO VAL ILE ALA GLU SER GLY ILE GLN THR GLN GLN  
 210 215 220  
 ASP VAL GLU LYS LEU ALA ALA ALA GLY PHE ASN ALA VAL LEU ILE GLY  
 225 230 235 240  
 GLU THR LEU MET ARG SER LYS HIS LYS ARG LYS LEU ILE THR ALA PHE  
 245 250 255  
 ARG GLY ILE

<210> 179  
 <211> 341

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 179

MET ILE LYS GLN ALA ILE GLU LYS VAL VAL ASN HIS GLU ASP LEU THR  
1 5 10 15  
PHE GLU GLU SER GLN ALA VAL LEU ASP GLU ILE MET ASN GLY GLU ALA  
20 25 30  
SER GLU VAL GLN THR ALA SER LEU LEU THR ALA LEU THR ALA LYS ARG  
35 40 45  
PRO THR ILE ASP GLU ILE ALA GLY ALA ALA ALA SER MET ARG ARG HIS  
50 55 60  
ALA LEU ALA PHE PRO GLU THR LYS ASP VAL LEU GLU ILE VAL GLY THR  
65 70 75 80  
GLY GLY ASP HIS ALA ASN THR PHE ASN ILE SER THR THR SER ALA ILE  
85 90 95  
VAL VAL ALA ALA THR GLY THR PRO VAL ALA LYS HIS GLY ASN ARG ALA  
100 105 110  
ALA SER SER LYS SER GLY ALA ALA ASP VAL LEU GLU ALA LEU GLY LEU  
115 120 125  
ASP ILE ASN GLU THR PRO ALA ILE SER TYR GLN SER LEU GLN GLU ASN  
130 135 140  
ASN LEU ALA PHE LEU PHE ALA GLN GLU TYR HIS LYS SER MET LYS TYR  
145 150 155 160  
VAL ALA PRO VAL ARG LYS GLN LEU GLY PHE ARG THR ILE PHE ASN ILE  
165 170 175  
LEU GLY PRO LEU ALA ASN PRO ALA HIS PRO THR ARG GLN LEU LEU GLY  
180 185 190  
VAL TYR ASP GLU THR LEU LEU GLU PRO LEU ALA ASN VAL LEU LYS LYS  
195 200 205  
LEU GLY VAL THR ASN ALA LEU VAL VAL HIS GLY ARG ASP GLY LEU ASP  
210 215 220  
GLU MET THR THR ALA ALA GLU THR ALA VAL VAL GLU LEU ASN ALA GLY  
225 230 235 240  
GLN LEU THR GLN TYR THR VAL THR PRO GLU GLN PHE GLY PHE ASN ARG  
245 250 255  
SER GLN ARG ALA ASP LEU VAL GLY GLY THR PRO GLU GLU ASN ALA GLN  
260 265 270  
ILE THR GLN ASN THR LEU ALA GLY LYS GLN GLY PRO GLN ARG ASP ILE  
275 280 285  
VAL LEU LEU ASN ALA GLY ALA ALA LEU HIS LEU ALA HIS PRO GLU LEU  
290 295 300  
SER ILE GLN ASP GLY ILE ALA LEU ALA ALA GLU THR ILE ASP ALA GLY  
305 310 315 320  
LYS ALA ARG GLU GLU LEU ASN HIS LEU ARG ALA PHE SER ALA LYS ARG  
325 330 335  
LYS ASP VAL VAL ALA  
340

<210> 180

<211> 199

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 180

MET VAL LYS VAL LYS VAL CYS GLY LEU MET HIS PRO GLU ASP ILE LEU  
1 5 10 15

ALA ILE ASN ALA ALA GLN VAL ASP PHE ALA GLY PHE VAL PHE ALA SER  
           20                  25                  30  
 GLY ARG HIS HIS VAL THR LEU GLU GLN ALA VAL ALA LEU ARG LYS LEU  
           35                  40                  45  
 LEU HIS PRO ASP ILE GLN PRO GLU GLY VAL PHE VAL HIS GLU SER VAL  
  
           50                  55                  60  
 ASP ASP ILE LEU ALA ILE TYR GLN ALA GLY ALA ILE GLU ILE ALA GLN  
 65                  70                  75                  80  
 LEU HIS ARG THR ASN THR PRO THR GLU ILE LYS GLN LEU GLN HIS ALA  
                   85                  90                  95  
 GLY LEU GLN VAL ILE GLN VAL PHE GLU ARG GLN ALA ILE ASP LEU THR  
           100                  105                  110  
 SER LEU ALA ASP TYR LEU MET VAL ASP SER GLY LYS GLY SER GLY GLN  
           115                  120                  125  
 LEU LEU ASN LEU ALA ALA ILE PRO HIS ILE THR ARG PRO LEU ILE LEU  
           130                  135                  140  
 ALA GLY GLY LEU THR PRO GLU ASN VAL ALA ARG ALA ILE GLN VAL VAL  
 145                  150                  155                  160  
 HIS PRO THR ILE VAL ASP VAL SER SER GLY VAL GLU THR ALA GLY HIS  
                   165                  170                  175  
 LYS ASP ALA HIS LYS ILE HIS GLN PHE THR GLN ASN ALA LYS GLU GLU  
           180                  185                  190  
 ILE THR TYR GLU ASN THR LYS  
           195

<210> 181

<211> 225

<212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 181

MET LEU PHE CYS TYR ARG ALA ILE HIS TYR ALA ALA GLN TYR ILE ALA  
   1                  5                  10                  15  
  
 GLU HIS PHE LEU GLU LYS ALA VAL ARG TYR ASN THR VAL ARG ASN ALA  
           20                  25                  30  
 PHE GLY TYR THR GLY THR PHE GLU GLY ARG ARG ILE SER VAL GLN ALA  
           35                  40                  45  
 THR GLY MET GLY ILE PRO SER ILE SER ILE TYR VAL ASN GLU LEU ILE  
           50                  55                  60  
 GLN ASP TYR GLY VAL LYS THR LEU ILE ARG VAL GLY THR ALA GLY GLY  
 65                  70                  75                  80  
 MET GLY SER ASP VAL LYS VAL ARG ASP VAL ILE LEU VAL GLN GLY SER  
           85                  90                  95  
 SER THR ASP SER SER ILE VAL LEU ASN THR PHE GLY ALA GLY MET TYR  
           100                  105                  110  
 PHE ALA PRO ILE ALA ASP PHE GLN LEU LEU ARG GLU ALA ALA ASN LEU  
           115                  120                  125  
 ALA ASP ALA GLY ALA LEU ARG TYR HIS VAL GLY ASN VAL LEU GLY GLU  
           130                  135                  140  
 ASP ARG PHE TYR ASN ASP GLU MET ASP ARG GLN LYS LEU ILE ASP TYR  
  
           145                  150                  155                  160  
 GLY VAL LEU ALA THR GLU MET GLU THR PRO ALA LEU TYR LEU LEU ALA  
                   165                  170                  175

ALA LYS PHE HIS ALA GLN ALA LEU SER ILE LEU THR VAL SER ASN HIS

180 185 190  
LEU ILE THR GLY GLU GLU THR THR ALA GLN GLU ARG GLN THR SER PHE  
195 200 205  
ASN ASP MET ILE GLY LEU ALA LEU GLY VAL ALA LYS LYS ILE PRO VAL  
210 215 220  
ARG  
225

<210> 182  
<211> 741  
<212> PRT  
<213> LACTOBACILLUS RHAMNOSUS

<400> 182  
MET ALA GLU GLU VAL GLU LEU THR GLN PRO ASP VAL MET LYS LEU CYS  
1 5 10 15  
LYS ALA TYR MET ASN PRO GLU HIS LEU ALA PHE VAL GLU LYS ALA TYR  
20 25 30  
LYS PHE ALA ALA TYR VAL HIS LYS ASP GLN VAL ARG LYS SER GLY GLU  
35 40 45  
PRO TYR ILE ILE HIS PRO ILE GLN VAL ALA GLY ILE LEU ALA GLU LEU  
50 55 60  
LYS MET ASP PRO GLU THR VAL ALA SER GLY TYR LEU HIS ASP VAL VAL  
65 70 75 80  
GLU ASP THR ASN ILE THR LEU GLY ASP ILE GLU GLU VAL PHE GLY HIS  
85 90 95  
ASP VAL ALA VAL ILE VAL ASP GLY VAL THR LYS LEU SER LYS VAL THR  
100 105 110  
TYR VAL ALA HIS LYS ASP GLU LEU ALA GLU ASN HIS ARG LYS MET LEU  
115 120 125  
LEU ALA MET ALA LYS ASP LEU ARG VAL ILE MET VAL LYS LEU ALA ASP  
130 135 140  
ARG LEU HIS ASN MET ARG THR LEU GLN HIS LEU ARG PRO ASP LYS GLN  
145 150 155 160  
ARG ARG ILE ALA ASN GLU THR LEU GLU ILE TYR ALA PRO LEU ALA ASP  
165 170 175  
ARG LEU GLY ILE SER THR ILE LYS TRP GLU LEU GLU ASP LEU SER LEU  
180 185 190  
ARG TYR LEU ASN PRO GLN GLN TYR TYR ARG ILE ALA HIS LEU MET ASN  
195 200 205  
SER LYS ARG THR GLU ARG GLU ALA TYR ILE GLN GLU ALA ILE GLU GLU  
210 215 220  
ILE LYS LYS ALA LEU ALA ASP LEU HIS ILE LYS TYR GLU ILE TYR GLY  
225 230 235 240  
ARG PRO LYS HIS ILE TYR SER ILE TYR LYS LYS MET ARG ASP LYS HIS  
245 250 255  
LYS GLN PHE ASP GLU LEU TYR ASP LEU LEU ALA ILE ARG VAL ILE THR  
260 265 270  
GLU THR ILE LYS ASP CYS TYR ALA VAL LEU GLY ALA ILE HIS THR LYS  
275 280 285  
TRP LYS PRO MET PRO GLY ARG PHE LYS ASP TYR ILE ALA MET PRO LYS  
290 295 300  
ALA ASN LEU TYR GLN SER ILE HIS THR THR VAL ILE GLY PRO MET GLY  
305 310 315 320  
LYS PRO LEU GLU VAL GLN ILE ARG THR GLU GLU MET HIS HIS VAL ALA

325 330 335  
 GLU TYR GLY VAL ALA ALA HIS TRP ALA TYR LYS GLU GLY GLN THR SER  
 340 345 350  
 LYS VAL GLN TYR ASP LYS ALA GLY LYS LYS LEU ASP ILE PHE ARG GLU  
 355 360 365  
 ILE LEU GLU LEU GLN ASP GLU SER SER ASP ALA ALA ASP PHE MET GLU  
 370 375 380  
 SER VAL LYS GLY ASP ILE PHE THR ASP ARG VAL TYR VAL PHE THR PRO  
 385 390 395 400  
 LYS GLY ASP VAL TYR GLU LEU PRO LYS GLY SER ASN PRO LEU ASP PHE  
 405 410 415  
 GLY TYR LEU ILE HIS THR GLU VAL GLY ASN HIS THR VAL GLY ALA LYS  
 420 425 430  
 VAL ASN GLY LYS ILE VAL PRO LEU ASN TYR VAL LEU LYS ASN GLY ASP  
 435 440 445  
 ILE VAL GLU MET LEU THR ALA SER GLY SER ALA PRO SER ARG ASP TRP  
 450 455 460  
 ILE LYS LEU VAL TYR THR SER ARG ALA ARG ASN LYS ILE LYS ARG TYR  
 465 470 475 480  
 PHE LYS GLN ALA ASP LYS SER GLU ASN ALA GLU LYS ALA ARG ASP MET  
 485 490 495  
 LEU GLU HIS GLU LEU GLN GLU GLY TYR VAL PRO LYS ASP PHE MET  
 500 505 510  
 THR GLN GLU ASN MET THR GLY LEU MET GLN ARG LEU ASN PHE GLN THR  
 515 520 525  
 GLU ASP GLU LEU MET SER SER ILE GLY TYR GLY GLU TYR THR PRO LYS  
 530 535 540  
 VAL ILE ALA ASN ARG LEU THR GLU LYS PHE ARG HIS ALA LYS ALA GLU  
 545 550 555 560  
 LYS ASP ARG LYS ALA LYS GLU ALA ALA ILE LEU SER LYS ASN GLN LYS  
 565 570 575  
 VAL THR THR VAL SER SER GLU LYS HIS GLN PRO GLN THR HIS SER GLU  
 580 585 590  
 ASP GLY VAL VAL ILE GLU GLY VAL ASP ASN LEU LEU VAL HIS LEU ALA  
 595 600 605  
 LYS CYS CYS MET PRO VAL PRO GLY ASP ALA ILE VAL GLY TYR VAL THR  
 610 615 620  
 LYS GLY ARG GLY VAL THR VAL HIS ARG ALA ASP CYS PRO ASN VAL GLN  
 625 630 635 640  
 SER SER ARG GLU MET SER GLY ARG LEU ILE ASP VAL ARG TRP GLU ASN  
 645 650 655  
 GLU ALA VAL GLN LYS GLN LEU PHE ASN THR ASP LEU GLU ILE TYR GLY  
 660 665 670  
 TYR ASN ARG SER GLY LEU LEU ASN ASP VAL LEU GLN VAL LEU ASN ALA  
 675 680 685  
 GLN THR LYS ALA LEU ASN ASN ILE ASN GLY ARG VAL ASP HIS ASP LYS  
 690 695 700  
 MET ALA ASP ILE HIS VAL LYS VAL GLY VAL ARG ASN LEU ALA HIS LEU  
 705 710 715 720  
 ASP LYS LEU MET ASP ALA VAL LYS ASN VAL PRO ASP ILE TYR GLU VAL  
 725 730 735  
 LYS ARG ALA ASN GLY  
 740

<210> 183  
 <211> 245  
 <212> PRT

<213> LACTOBACILLUS RHAMNOSUS

<400> 183

ILE LEU VAL ILE LYS ARG SER SER ILE MET LYS ALA PRO THR GLN PRO  
1 5 10 15  
ILE VAL VAL HIS PHE PRO LEU ARG GLY GLU TRP LEU ALA PRO ASN THR  
20 25 30  
PRO GLY SER LYS VAL PRO SER HIS GLY SER ASN LYS PHE GLY THR ARG  
35 40 45  
TYR ALA TYR ASP PHE ILE GLN VAL ASN TRP GLN LYS LEU GLY ARG PRO  
50 55 60  
ALA TYR ARG GLY SER LEU LEU LYS TYR LEU PHE ARG GLY ILE PRO ILE  
65 70 75 80  
ASP ASP TYR TYR CYS TYR GLY GLN PRO ILE TYR ALA PRO ALA ASN GLY  
85 90 95  
LEU VAL VAL ARG ALA GLU ASP HIS TYR PRO GLU ARG LYS ARG THR SER  
100 105 110  
PHE LEU GLY ASP LEU LEU ARG ALA ARG ASN ALA ALA ARG HIS PHE ASP  
115 120 125  
PRO LYS ARG ASN ASN VAL GLN ALA VAL ALA GLY ASN PHE VAL ILE LEU  
130 135 140  
GLN ILE HIS ASP HIS VAL TYR ALA ALA LEU CYS HIS LEU GLN THR ASP  
145 150 155 160  
SER ILE GLN VAL GLY ARG GLY GLN THR VAL GLN ALA GLY ASP LEU LEU  
165 170 175  
GLY ARG VAL GLY HIS SER GLY ASN SER PHE GLY PRO HIS LEU HIS PHE  
180 185 190  
GLN LEU MET ASN ASN SER ASP ILE GLU VAL ALA ALA GLY LEU PRO CYS  
195 200 205  
ALA PHE ALA GLU TYR GLU LEU PHE ALA GLY ASN SER TRP LEU THR GLN  
210 215 220  
GLU ASN ALA VAL PRO SER LYS THR ASP ARG ILE CYS PHE VAL SER PRO  
225 230 235 240  
LYS SER GLY PRO PHE  
245

<210> 184

<211> 22

<212> DNA

<213> ARTIFICIAL SEQUENCE

<220>

<223> MADE IN A LAB

<400> 184

ACATATTGAC GCTCCAAAAG GC

22

<210> 185

<211> 19

<212> DNA

<213> ARTIFICIAL SEQUENCE

<220>

<223> MADE IN A LAB

<400> 185

GAGCCGTTGT TTCTTCACC

19

<210> 186  
<211> 22  
<212> DNA  
<213> ARTIFICIAL SEQUENCE

<220>  
<223> MADE IN A LAB

<400> 186  
AGCTTACATG AACCCCTGAAC AC 22

<210> 187  
<211> 21  
<212> DNA  
<213> ARTIFICIAL SEQUENCE

<220>  
<223> MADE IN A LAB

<400> 187  
ACCTAAAACC GCATAGCAAT C 21

2

2